PB90-162801

Superfund Record of Decision (EPA Region 1): South Municipal Water Supply Well, NH. (First Remedial Action), September 1989

(U.S.) Environmental Protection Agency, Washington, DC

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September 1989

EPA

Superfund Record of Decision:

South Municipal Water Supply Well, NH

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16. Abstract (Limit: 200 words)

The 250-acre South Municipal Water Supply Well site is approximately two miles south of the Town of Peterborough, in Hillsborough County, New Hampshire. The site includes the Contoocook River, the Noone Pond System, and a wetlands area. Also on the site are the New Hampshire Ball Bearings Incorporated (NHBB) manufacturing facility, several commercial establishments, and several apartments. Land use in the vicinity of the site is rural and undeveloped. Ground water flow beneath the site is generally eastward from the NHBB property towards the South Municipal Well. The town of Peterborough discontinued use of the South Well in May 1983 after the State discovered VOC contamination in water samples taken from the well. Subsequent investigations revealed that a plume of contaminated ground water extended from under the NHBB property to the vicinity of the South Well. VOC contamination was also detected in soil on the NHBB property, and wetlands sediment was found to be contaminated with PCBs, metals, and PAHs. Investigations attributed the contamination to in-house chemical releases that were subsequently washed out through floor drains or slop sinks to outfalls, or washed out through facility doors. Exterior releases contributed to contamination at the site through the draining of a truck-mounted waste solvent tank. The primary contaminants of concern affecting the soil and ground water are VOCs including PCE, TCE, and toluene; the primary (See Attached Sheet)

17. Document Analysis a. Descriptors
Record of Decision - South Municipal Water Supply Well, NH
First Remedial Action
Contaminated Media: soil, sediment, gw
Key Contaminants: VOCs (PCE, TCE, toluene), other organics (PCBs, PAHs), metals

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 129
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Department of Commerce

EPA/ROD/R01-89/044
South Municipal Water Supply Well, NH
First Remedial Action

16. Abstract (continued)

contaminants of concern affecting the sediment are organics including PCBs and PAHs, and metals.

The selected remedial action for this site includes ground water pumping from the highly contaminated NHBB area plume and treatment using a phase separation settlement tank/pretreatment system, air stripping, carbon columns for air emission control, and onsite discharge; ground water pumping from the dilute plume outside the NHBB area and treatment using air stripping and carbon columns and onsite discharge; in situ vacuum extraction of 7,500 cubic yards of contaminated onsite soil; excavation and/or dredging with dewatering of 1,170 cubic yards of wetlands sediment and offsite disposal; wetlands restoration with clean fill, surface contouring, and revegetation; implementation of institutional controls restricting ground water use and well installation; and long-term ground water monitoring. The estimated present worth cost for this remedial action is $7,387,769, which includes an estimated present worth O&M cost of 3,992,105.

DECLARATION OF RECORD OF DECISION

SITE NAME AND LOCATION

South Municipal Water Supply Well
Peterborough, New Hampshire

STATEMENT OF PURPOSE

This Decision Document presents the selected remedial action for the South Municipal Water Supply Well Site in Peterborough, New Hampshire, developed in accordance with the Comprehensive Environmental Response, Compensation and liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and to the extent practicable, the National Oil and Hazardous Substances Contingency Plan (NCP), 40 CFR Part 300 et seq., as amended. The Region I Administrator has been delegated the authority to approve this Record of Decision.

STATEMENT OF BASIS

This decision is based on the administrative record which has been developed in accordance with Section 113(k) of CERCLA and which is available for public review at the Peterborough Public Library in Peterborough, New Hampshire and at the Region I Waste Management Division Records Center in at 90 Canal Street, Boston, Massachusetts. The attached index identifies the items which comprise the administrative record upon which the selection of the remedial action is based.

DESCRIPTION OF THE SELECTED REMEDY

The selected remedy for the South Municipal Water Supply Well Site includes both source control and management of migration (or groundwater control) components to obtain a comprehensive remedy.

The source control remedial measures include:

- In-situ treatment of contaminated soils with a vacuum extraction system to reduce contaminant levels in the 7500 cubic yards of on-site soils to specified soil target cleanup levels for volatile organic compounds. Attaining the soil target cleanup levels will eliminate the potential migration of contaminants from the soils into the groundwater at levels exceeding groundwater cleanup target levels. An activated carbon canister or other pollution control device will be used to clean the air emissions before discharge to the atmosphere.

- Excavation and/or dredging of sediments to remove approximately 1170 cubic yards of sediments in the wetlands contaminated with PCBs at levels greater than 1 ppm and with PAHs at levels greater that 1.1 ppm. The excavated sediments will be dewatered, placed in containers, and transported to an off-site, licensed RCRA landfill for disposal. Achievement of the target sediment cleanup levels will require the disturbance and temporary loss of areas classified as wetlands. The wetlands excavation/dredging will be implemented so as to avoid or minimize impacts on and disturbance to the wetland areas. Following the completion of excavation activities in the wetlands, a wetlands restoration program will be implemented to return the affected wetland areas to their original conditions, to the maximum extent practicable.

The management of migration remedial measures include:

* Active restoration of the groundwater aquifers contaminated with volatile organic compounds using air stripping and carbon columns for air emission control. This component of the remedy will extract and treat groundwater contaminated by the Site to specified groundwater target cleanup levels that will attain drinking water standards.

* Groundwater will be extracted with two systems. The New Hampshire Ball Bearings, Inc. (NHBB) area groundwater extraction system will consist of conventional extraction wells, located in the vicinity of the northeast corner of the NHBB building and pumping at a total rate of approximately 200 gpm. The extraction system for groundwater in the dilute plume area would consist of groundwater extraction wells, pumping at a rate of approximately 400 gpm. The dilute plume extraction wells will be placed so as to withdraw contaminated groundwater that has migrated from the NHBB area.

* Contaminated groundwater extracted by these two extraction systems will be treated on-site by air stripping to reduce contaminant levels in the treated water to the groundwater target cleanup levels. Groundwater from the NHBB area will first pass through a phase separation settlement tank/pretreatment system where dense nonaqueous phase liquid (DNAPL) could separate from solution prior to air stripping. DNAPLs in this tank would be drained off periodically for recycling or disposal. The remedy is expected to reach target cleanup levels in the dilute plume area in 7.5 years, while groundwater in the NHBB area is expected to reach target cleanup levels in 19 to 32 years. This remedy will continue to extract and treat groundwater in the NHBB area and the dilute plume area until the cleanup targets are achieved in all locations of the groundwater aquifer.

Additional measures include long-term environmental monitoring throughout the implementation of the remedy to ensure its effectiveness. Also, the remedy includes institutional controls to restrict use of the South Municipal Water Supply Well and prevent installation of private drinking water wells to ensure that groundwater in the zone of contamination will not be used as a drinking water source until drinking water standards are met.

DECLARATION

The selected remedy is protective of human health and the environment, attains federal and state requirements that are applicable or relevant and appropriate for this remedial action and is cost-effective. This remedy satisfies the statutory preference for remedies that utilize treatment as a principal element to reduce the toxicity, mobility, or volume of hazardous substances. In addition, this remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

Sept 27, 1989
Date

Paul G. Keough
Paul G. Keough, Acting
Regional Administrator

SOUTH MUNICIPAL WATER SUPPLY WELL

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SOUTH MUNICIPAL WATER SUPPLY WELL

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ROD DECISION SUMMARY

I. SITE NAME, LOCATION AND DESCRIPTION

SITE NAME:	South Municipal Water Supply Well
SITE LOCATION:	Peterborough, New Hampshire
SITE DESCRIPTION:	

The Peterborough South Municipal Water Supply Well Superfund Site (the Site) is located approximately two miles south of the center of the Town of Peterborough in Hillsborough County, New Hampshire. The South Well, situated at the edge of the Site, is located on Sharon Road, approximately 350 feet east of the Contoocook River (Figure 1). The Site area is approximately 250 acres.

Land use in the vicinity of the Site, particularly east of the river, is rural and undeveloped. A plumbing business and several apartments are situated on the property adjacent to, and south of, the well. Approximately 1,000 feet north of the well and west of the river are an automobile dealership and several commercial establishments. The New Hampshire Ball Bearings, Incorporated (NHBB) manufacturing facility is located approximately 1,200 feet west of the well.

The Site and adjacent area is served by a municipal water system which receives water from two wells located north of the town center. The closest residential wells are located approximately one-half mile north of the Site and upgradient.

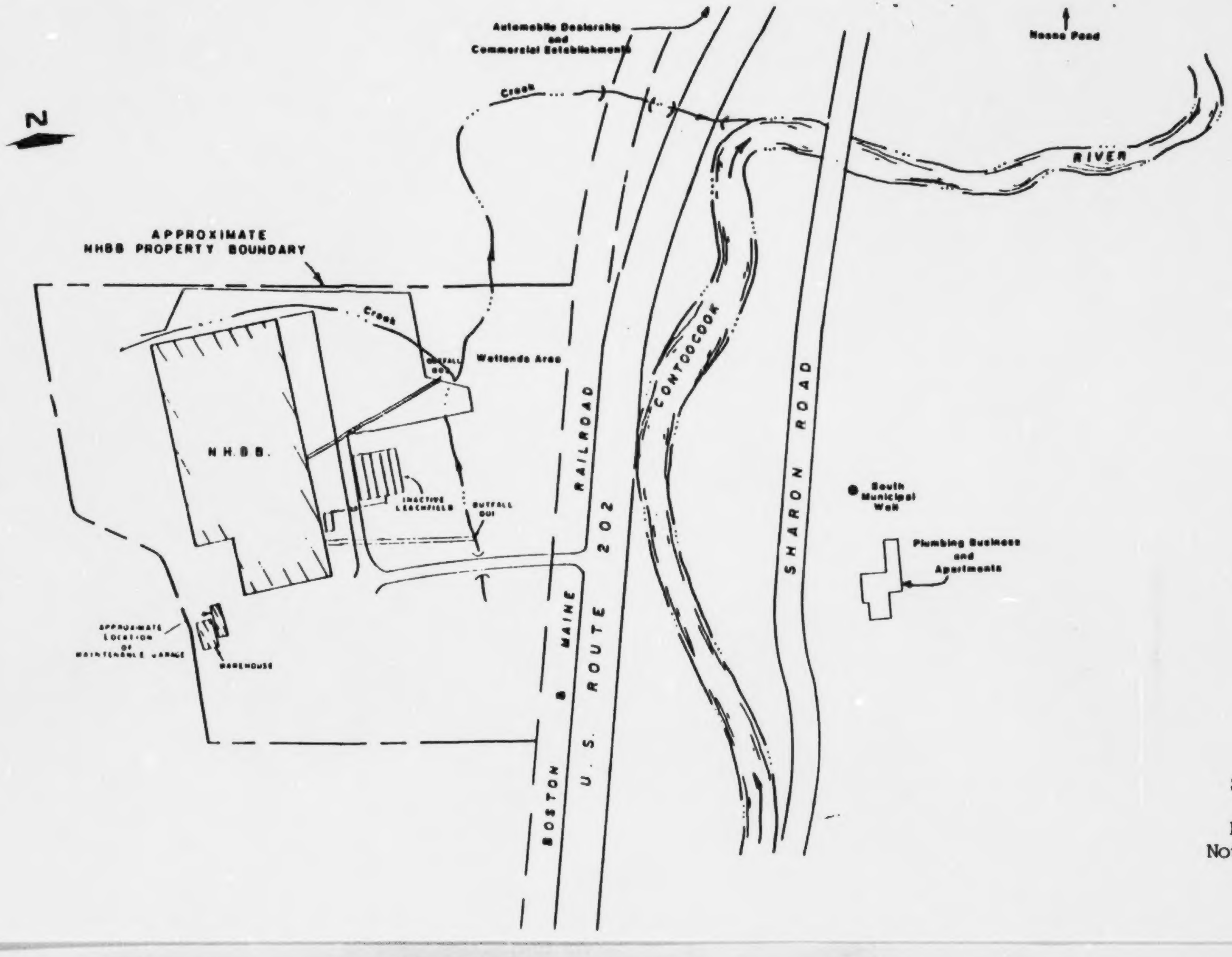
Route 202, the main traffic artery to Peterborough from the south, and the abandoned Boston and Main railroad which parallels Route 202, run north-south through the Site. Two major surface-water environments, the Contoocook River/Noone Pond system, and a wetlands area, are present at the site. The river and wetlands area are fed by two small unnamed creeks located east and north of the NHBB plant.

A more complete description of the site can be found in the "Remedial Investigation Report, South Municipal Well Site", April, 1989, on pages 2-5.

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

A. Response History

The South Municipal Well was installed in 1952. The gravel packed well is 70.5 feet deep with a reported safe yield of 0.5 million gallons per day (mgd). On October 22, 1982, the New Hampshire Water Supply and Pollution Control Commission (NHWSPCC) tested a sample of water taken from the well for volatile organic compounds (VOCs). The sample showed the presence of over 100 parts per billion (ppb) of total volatile organics. Subsequent sampling on December 1, 1982 confirmed those results. At the recommendation of the U.S. Environmental Protection Agency (EPA) and NHWSPCC, the Town of Peterborough discontinued the use of the well. The Town changed the source of municipal water to the North Well which had been drilled and was on standby at the time.



N
APPROXIMATE NHBB PROPERTY BOUNDARY
Automobile Dealership and Commercial Establishments
Noone Pond
Creek
RIVER
Creek
Wetlands Area
OUTFALL 002
N.H.B.B.
INACTIVE LEACHFIELD
OUTFALL 001
RAILROAD
202
CONTOOCOOK
SHARON ROAD
South Municipal Well
Plumbing Business and Apartments
APPROXIMATE LOCATION OF MAINTENANCE GARAGE
WAREHOUSE
BOSTON & MAINE
U. S. ROUTE

SITE MAP

FIGURE I
Not to Scale

In May, 1983, the South Municipal Well area was inspected and ranked according to the Hazard Ranking System (HRS). It was listed as number 393 on the National Priorities List (NPL) of sites eligible for funding under the Comprehensive Environmental, Response, Compensation and Liability Act of 1980 (CERCLA), commonly known as Superfund.

During 1984 and 1985, a hydrogeologic investigation was undertaken by NHWSPCC in order to characterize the aquifer supplying groundwater to the South Well. NHBB conducted investigations into chemical use in the Peterborough facility and to characterize on-property groundwater. As a result of these investigations, it was determined that a plume of contaminated groundwater extended from under the NHBB property to the vicinity of the South Well.

A more detailed description of the Site history can be found in the Remedial Investigation Report on pages 5-16 and pages 63-69.

B. Enforcement History

On January 30, 1985, the Agency notified NHBB, which owned a portion of the Site and generated wastes which were released to the environment, eventually affecting the South Well, of the company's potential liability with respect to the Site. Negotiations commenced with NHBB on January 30, 1985, regarding the performance of the Remedial Investigation/Feasibility Study (RI/FS) for the Site. On July 26, 1986, under an Administrative Order by Consent with EPA, NHBB agreed to conduct the RI/FS under EPA oversight.

NHBB has remained active in the remedy selection process for this Site by identifying and evaluating the remedial alternatives in the FS and commenting upon the Agency's proposed plan. These comments were presented by NHBB during the public comment period at a public meeting in Peterborough and submitted in writing. In addition, NHBB met with EPA in Boston during the public comment period to discuss NHBB's comments and proposal. Summaries of the meetings and written comments were included in the Administrative Record. Responses to all comments are included in the Responsiveness Summary, Appendix C.

III. COMMUNITY RELATIONS

Through the Site's history, the community has been moderately involved. EPA has kept the community and other interested parties apprised of the Site activities through informational meetings, fact sheets, press releases and public meetings.

In August, 1986, EPA released a community relations plan which outlined a program to address community concerns and keep citizens informed about and involved in activities during remedial activities. On October 2, 1985, EPA held an informational meeting in the Peterborough Town Hall, Peterborough, New Hampshire, to describe the plans for the RI/FS.

On May 24, 1989, EPA held an informational meeting to discuss the results of the Remedial Investigation (RI). The Agency published a notice and brief analysis of the Proposed Plan in The Keene Sentinel on July 14, 1989, and made the plan available to the public at the Peterborough Public Library. Also, on July 20, 1989, EPA held an informational meeting to discuss the cleanup alternatives presented in the Feasibility Study (FS) and to present the Agency's Proposed Plan. During this meeting, the Agency answered questions from the public. From July 21, 1989 to August 19, 1989, the Agency held a thirty day public comment period to accept public comment on the alternatives presented in the FS and the Proposed Plan and on any other documents previously released to the public. On August 3, 1989, the Agency held an informal public hearing to accept any oral comments. A transcript of this meeting and the comments and the Agency's response to comments are included in the attached responsiveness summary.

Copies of the transcript and all comments are also available at the Peterborough Public Library and at the EPA Records Center at 90 Canal Street, Boston, Massachusetts, as part of the Administrative Record.

IV. SCOPE AND ROLE OF THE RESPONSE ACTION

The selected remedy was developed by combining components of different source control alternatives and a management of migration alternative to provide a comprehensive approach for site remediation. In summary, the remedy provides for extracting and treating groundwater in the vicinity of the northeast corner of the NHBB facility where groundwater contaminant concentrations are highest. Groundwater contaminated at lower levels, which has migrated beyond the NHBB property (the "dilute plume"), will also be extracted and treated on-site, which will also provide hydraulic control to protect the South Municipal Water Supply Well. To reduce high contaminant levels in soils around and under the northeast corner of the NHBB facility, the remedy calls for installing an in-situ vacuum extraction system. Finally, sediments from wetlands on-site contaminated above specified action levels will be excavated and/or dredged.

V. SITE CHARACTERISTICS

Chapter 2.0 of the "Feasibility Study Report, South Municipal Well Site," July, 1989, contains an overview of the RI. The significant findings of the RI are summarized below.

A. Geologic Characteristics

The site is situated in the Contoocook River Valley, on glacial/fluvial deposits approximately 20 to 90 feet in thickness. Deposits are dominantly sands and gravels, although silty layers are found dispersed both vertically and horizontally about the site area. Typical organic carbon contents for the sands and gravels are generally low, estimated to be 0.1%. The silty layers, some of which are highly contaminated, have an organic carbon content estimated to be 0.25%.

Fracture trace studies and analysis of core samples indicate that the bedrock varies from highly fractured to unfractured within the site area. Bedrock beneath the northeast corner of the NHBB facility is approximately 70-90 feet below the surface, with a trough trending northeast away from that area. Bedrock generally rises east of the Contoocook River.

B. Hydrogeologic Characteristics

The site lies in the Contoocook River drainage basin. A small unnamed brook transects the NHBB property at its north end, where it empties into the wetlands area of the NHBB property.

Three pumping tests were conducted on the site during the course of the RI, and another was conducted prior to the RI by the New Hampshire Department of Environmental Services. Two of the RI tests were conducted by pumping the South Municipal Well, and another by pumping a pilot study extraction well, EX-1. The zone of influence produced by pumping the South Well is elongated parallel to the Contoocook River, but the elongation is believed to be caused by boundary effects as opposed to an anisotropic aquifer. The zone of influence of well EX-1 is roughly circular, indicating the aquifer is isotropic in the vicinity of well EX-1. Aquifer parameters and behavior were determined from the data collected during these pump tests.

The overburden aquifer behaves differently than that of the bedrock, but a hydraulic connection exists between the two. The overburden aquifer is semi-confined to unconfined. The bedrock aquifer behaves as a leaky confined aquifer.

Aquifer parameters for the overburden aquifer are highly variable throughout the site. Vertical hydraulic conductivity is generally low relative to radial hydraulic conductivity indicating that lateral rather than vertical flow predominates.

Average flow direction and velocities were determined on the site from water table measurements. Average flow direction on the site under non-pumping conditions is controlled by the topography, with some occasional bedrock control when the water table is low. The average flow direction is east-northeast in the vicinity of the NHBB plant and changes to a northerly direction at the Contoocook River, paralleling the river. The groundwater velocities are unusually high, as the media is coarse and the gradients large.

A mini-piezometer study was conducted on the site to determine the interrelationship between groundwater and surface water. The results of the study indicate a hydraulic connection exists between groundwater and surface water at Noone Pond and at the sedge meadow/shallow marsh wetlands area located in the northeast portion of the NHBB property. At times of high flow, surface waters tend to recharge the aquifer; while at lower flow periods, groundwater tends to discharge to the wetlands and Noone Pond. Due to steep gradients east of the Contoocook River, there appears to be little interconnection in the Site area between the river and the aquifer.

C. Environmental Contamination

1. Air

The air sampling done at the site did not indicate any transport of VOCs from the NHBB property. Air sampling done with an OVA found no significantly elevated levels of VOCs. The highest concentration, 1.5 ppm, was at the southwest corner of the building near a ventilation duct.

2. Soil

Laboratory and field analyses found VOC contamination in unsaturated soils at the site. Higher concentrations of VOCs in soils were found in association with areas of high concentrations of VOC contamination in the underlying groundwater (primarily the GZ-4 area). Summarized below are the findings of the soil investigations.

- The highest VOC concentration is found in the GZ-4 area (up to 5000 ppm of tetrachloroethylene). The concentrations present indicate that release of VOCs directly to Site soils has taken place in the GZ-4 area.
- VOC concentrations were relatively high in the vicinity of GZ-105. Concentrations appear to increase with proximity to the eastern edge of the fill/parking pad in the GZ-105 area, suggesting that the VOCs are attributable to surface release at that location, as opposed to contributions from outfall 002, which has been tied to plant floor drains and sinks.
- Low levels of VOCs were detected in the leachfield area soils. It is possible that these are present as a result of volatilization from contaminated groundwater. The low concentration found in leachfield area soils strongly suggests that it is not a source contributing to groundwater contamination.

3. Surface Water

Low concentrations of VOCs were detected in surface water samples in the sedge meadow wetland area east and northeast of the NHBB facility. No VOC contamination has been detected in either Noone Pond or the Contoocook River. The VOC contamination in the wetlands could result from surface runoff from the NHBB parking lot, discharge from active roof drains from NHBB, discharge of contaminated groundwater to the wetlands area, or leaching of VOCs from contaminated soils. However, the presence of VOCs, most notably at location SW/SD-8, does not appear to be the result of current releases from NHBB outfalls since sampling at the outfalls has not detected elevated concentrations of VOCs. While the surface water contamination could be the result of discharge of contaminated groundwater, piezometric data suggests that the wetlands (sedge meadow) in the area of contamination is not an area of groundwater discharge. While this may be a seasonal effect, it is suggestive that the surface water and associated sediment contamination is a result of leaching of VOCs from contaminated soils, most likely from the area of GZ-105 identified in the discussion above.

4. Sediments

Analysis of sediment samples in the sedge meadow wetlands area east and northeast of the NHBB facility indicated the presence of polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), and metal contamination. The highest concentrations of PCBs and PAHs, in addition to the elevated metal concentrations, were found at the terminus of outfalls 001 and 002. These outfalls serviced floor drains and slop sinks from the NHBB facility prior to their closure or alteration (outfall 001 serviced the transformer room). PCBs and metals were also found in the distribution box for the unused septic system at the NHBB facility.

PAHs are present in highest concentration at the terminus of outfall 001, and in lower concentrations in the area of outfall 002, but do not appear dispersed over a large area beyond those points. Since transport of PAH contamination is expected to coincide with transport of sediment(PAHs tend to bind to organic soils or sediments), PAH contamination is limited to the areas near the release, with some minor dispersion downstream from the release points. Outfall 001 appears to have been the major release point of PAH contamination. Information on past activities indicates that outfall 001 was tied to a number of sections of the NHBB facility where PAHs might be expected, such as areas where burnt or spent cutting or machine oils containing PAHs might have been washed down floor drains.

Similar to the distribution of PAHs, the highest concentrations of PCBs were found in the sediments at the ends of outfalls 001 and 002. PCB contamination is confined to areas associated with relatively significant flow rates, and are not dispersed within the sedge meadow area. PCB contamination would be expected to adsorb to soils or sediments, and migrate with sediments. The lack of detectable PCBs in samples from areas of NHBB property outside the sedge meadow suggests that the PCB contamination did not migrate to its current location through the unnamed brook, or from upslope areas to the south. Further, the lack of detectable PCBs at or near the old Boston and Maine railbed indicates the PCB contamination is not associated with rail use. In addition, evaluation of air photos indicates that prior to 1980, the area currently occupied by the sedge meadow and shallow marsh was unsaturated (or partially so), and that flow from the outfall was accommodated by excavated drainage ditches. The PCB contamination, if released prior to 1980 (as is very likely the case), should be restricted to the areas of these ditches. The data gathered to date appears to corroborate this.

The presence of PCBs in very low concentrations in the sediment traps at the confluence of the wetlands and the Contoocook River suggests that PCB contaminated sediment has migrated to this point. However, no PCBs were detected downstream of the confluence. It is possible that the confluence of the wetlands and the Contoocook delineates the extent of PCB contamination.

5. Groundwater

The major constituents of the contamination plume are 1,1,1-trichloroethane, trichloroethylene, and tetrachloroethylene. Interviews and historical investigations indicate that these solvents are or have been used by NHBB as pure products or mixtures. These investigations also indicate that these and other compounds were released to the environment through:

- in-house releases subsequently washed out floor drains or sinks to outfalls, or washed out facility doors, and
- exterior releases through the draining of a truck-mounted waste solvent tank.

The highest concentrations of VOC contamination center about the GZ-4 well cluster area, and those areas immediately downgradient (EM-B1 and GZ-104). The distribution of contamination between 1 and 10 ppm in the upper portion of the aquifer extends across the front of the building and disperses downgradient to the area of the MW-5 well cluster. Contamination in concentrations less than 1 ppm extends from the tumble/ garage area underneath the NHBB facility. The plume disperses downgradient to the northeast, and in the upper portion of the aquifer, extends at least as far as boring B-5 on Route 202.

The contaminant distribution in the lower portion of the overburden aquifer is, in general, very similar to the extent and distribution in the upper portion of the aquifer. Again, contamination is present under the building and in the tumble/garage area. The downgradient distribution of the dilute portion of the plume, however, is less extensive. Total VOC contamination between 100 and 1000 ppb extends to at least EM-3 in the upper portion of the aquifer; however, in the lower portion of the aquifer, the same concentration of contamination extends only as far as the MW-5 area. Vertical hydraulic conductivity throughout the Site is low compared to radial hydraulic conductivity, and can account for the lesser extent of lower overburden contamination. Surface release of VOC contaminants would be expected to disperse more rapidly radially than downward into lower overburden materials.

The centering of high concentrations of VOCs in the GZ-4 area, coincident with the high soil contamination discussed earlier, and the evaluation of air photos strongly indicate that the area was the location of significant VOC releases to the ground surface. These solvents have migrated as a free phase (the solvent remains in concentrated form) to a position in the saturated zone approximately 50 feet below ground surface in the GZ-4 area. While the exact extent of free phase contamination is not known, the potential volume, based on possible tank truck releases, is quite large. Migration of solute from this free phase contamination is believed to be the major source for the plume found downgradient from the GZ-4 area. This is consistent with groundwater flow directions, which are oriented parallel to the elongate direction of the plume. However, continued leaching of VOCs from contaminated soils is also expected to contribute significantly to the contaminant plume.

The northern boundary of the plume near or beneath Noone Pond is not exactly defined. However, concentrations are very dilute in the EM-3/EM-109 area (south of Noone Pond). At EM-110, north of the Pond, no VOCs were detected. Quarterly monitoring of EM-109 during December of 1988, did not detect any VOCs, indicating that the plume terminates at some point near EM-109 or between EM-109 and EM-110.

A complete discussion of site characteristics can be found in the Remedial Investigation Report on Pages 63-225.

VI. Summary of Site Risks

An Endangerment Assessment (EA) was performed to estimate the probability and magnitude of potential adverse human health and environmental effects from exposure to contaminants associated with the site. Sixteen (16) contaminants of concern, listed on page 244 of the RI were selected for evaluation in the EA. These contaminants constitute a representative subset of the more than forty (40) contaminants identified at the Site during the Remedial Investigation. The 16 contaminants were selected to represent potential on-site hazards based on toxicity, concentration, frequency of detection, and mobility and persistence in the environment.

Potential human health effects associated with the contaminants of concern in sediments, soils and groundwater were estimated quantitatively through the development of several hypothetical exposure scenarios. Incremental lifetime cancer risks and a measure of the potential for non-carcinogenic adverse health effects were estimated for the various exposure scenarios. Exposure scenarios were developed to reflect the potential for exposure to hazardous substances based on the characteristic uses and location of the site. A factor of special note that is reflected in the Endangerment Assessment is that the site is within the zone of influence of the South Municipal Water Supply Well when there is unrestricted pumping. Land use in and around the Site, however, is industrial and commercial.

Although on-site groundwater is not currently used for drinking water, this aquifer was used as a drinking water supply until contamination from the Site was discovered. Therefore, the aquifer is classified as an existing source of drinking water. As such, risks associated with the consumption of groundwater were evaluated and judged to be a likely exposure route which would result in potential health hazards. Another exposure route judged to be of potential health and environmental concern is direct contact with sediments on the NHBB property. The human health hazard was quantified while the threat to environmental receptors was discussed qualitatively. Other exposure routes evaluated include: direct contact with soils, inhalation of airborne contaminants, direct contact with surface waters and ingestion of fish.

A. Ingestion of Groundwater

The incremental lifetime cancer risks estimated for ingestion of water pumped from the South Well was 4.5×10^{-5}. The exposure scenario developed for evaluation of the risks associated with ingestion of groundwater involved a hypothetical off-property residential well intersecting the contaminant plume. Total incremental lifetime cancer risks for the average and maximum scenarios were 2.22×10^{-3} and 2.1×10^{-2}, respectively. For the maximum case scenario only, there is the potential for chronic toxic (non-carcinogenic) effects. The major contributors to the excess cancer risk were tetrachloroethylene and vinyl chloride, while the major contributor to non-carcinogenic health risks was tetrachloroethylene.

Ingestion of groundwater from a hypothetical residential well on NHBB property would result in excess incremental lifetime cancer risks of 3.0×10^{-2} and 3.5×10^{-1} for the average and maximum cases, respectively. This latter scenario, as a representation of the worst-case, is an estimation of the extreme risks associated with ingestion of groundwater from the most contaminated area of the Site.

B. Direct Contact with Sediments on NHBB Property

Direct contact with sediments in the wetlands area would result in exposure to contaminants through dermal absorption and incidental ingestion. The exposure scenario and risk assessment evaluate health impacts on children between the ages of 6 and 15 who would access the Site 50 times annually for 10 years. In the maximum exposure scenario, it is assumed that the child contacts the maximum contaminant levels during each event. The incremental lifetime cancer risks were 4.3×10^{-5} and 2.1×10^{-4} for the average and maximum scenarios, respectively. Assessment of non-carcinogenic health risks found no potential for chronic toxic effects for both average and maximum cases. PAHs were the major contributor to the cancer risk in this scenario.

There is little information regarding the toxicity of soil contaminated with PCBs or PAHs to aquatic freshwater organisms. It is thought that exposure to, or toxic effects from, contaminated sediments is primarily the result of exposure to contaminated interstitial water. The concentration of contaminants in the interstitial water is controlled by a number of factors, the most important of which are the organic carbon content of the soil and the organic carbon-water partition coefficient of the contaminant. Because the applicability of laboratory determined partition coefficients to natural systems is not entirely precise, and the organic carbon content of soils at the Site is highly variable, model calculations of exposure doses are approximate. For the wetlands area east and northeast of the NHBB facility, with an assumed fraction of organic carbon in the sediment of 0.5 and a K_{oc} (organic carbon partition coefficient) of 1.3×10^{5} for PCBs (Aroclor 1254, Kadeg et al., 1986), the average and maximum concentrations of PCBs (based on an assumed equilibrium partition model) in the interstitial water are 0.005 ppb and 0.4 ppb, respectively. This must be regarded as a rough estimate of PCB concentrations in interstitial water. EPA has established an Ambient Water Quality criterion for freshwater aquatic life under continuous exposure of 0.014 ppb.

PAHs and metals are expected to add to the total toxicity associated with the sediment contamination.

Bioaccumulation and biomagnification of contamination is a matter of concern with PCBs, PAHs, and metals. It is difficult, given limited data, to estimate the magnitude of the potential adverse effects of this on environmental receptors, including reproductory problems. Of particular concern is the potential for migratory birds ingesting aquatic invertebrates, emergent insects and sediments which are contaminated with PCBs.

A complete discussion of site risks can be found in the Remedial Investigation in Chapter 5.

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or, the environment.

VII. DOCUMENTATION OF NO SIGNIFICANT CHANGES

EPA adopted a proposed plan (preferred alternative) for remediation of the site in July, 1989. Components of the preferred alternative included:

1. In-situ vacuum extraction for contaminated soils;
2. Excavation and/or dredging with dewatering of sediments and off-site disposal;
3. Wetlands restoration;
4. Groundwater extraction and treatment by phase separation, as needed, and air stripping with carbon columns for air emission control;
5. Long-term environmental monitoring; and
6. Institutional controls, including restrictions on use of the South Municipal Water Supply Well.

The remedy selected in this document includes a minor change from the preferred alternative described in the proposed plan in one respect regarding the number of groundwater treatment facilities that will be required to treat the groundwater extracted from both the NHBB area plume and the dilute plume. The groundwater component of the selected remedy establishes groundwater cleanup levels, the period of time necessary to achieve those levels and restore the groundwater to drinking quality standards, and the rate for extracting and treating contaminated groundwater necessary to achieve the cleanup levels in the specified period of time. The number of groundwater treatment facilities that must be constructed to treat the specified volume of extracted groundwater is not specified. This aspect of the selected remedy is a change from the analyses presented in both the FS and the Proposed Plan, which described two separate air stripping treatment plants, one to handle the contaminated groundwater extracted from the dilute plume, and one to handle the extracted groundwater from the NHBB area plume. EPA does not consider this a significant change to the preferred alternative that was described in the Proposed Plan. Although the analysis of groundwater remedial alternatives and the preferred alternative in both the FS and the Proposed Plan discussed two separate treament facilities, EPA does not consider the possible use of one treatment facility to change the remedial objectives to be attained by the selected remedy. The remedy selected specifies the cleanup levels and rate of aquifer restoration, but leaves the decision on the number of facilities to the more detailed analyses to be undertaken during the remedial design. If it can be shown that onetreatment faciliy rather than two, can meet the remedial action objectives and the statutory requirements, and present an equivalent balance of the evaluation criteria, then one facility may be constructed. The principal remedial action objective will still be met, attainment of drinking water standards throughout the aquifer in the shortest practicable time. Furthermore, the estimated cleanup time for the dilute plume of 7.5 years appears to be a realistic objective on which to base plant capacities and groundwater extraction rates. Therefore, the protectiveness and effectiveness of the remedy will not be affected.

VIII. DEVELOPMENT AND SCREENING OF ALTERNATIVES

A. Statutory Requirements/Response Objectives

Prior to the passage of the Superfund Amendments and Reauthorization Act of 1986 (SARA), actions taken in response to releases of hazardous substances were conducted in accordance with CERCLA as enacted in 1980, and the revised National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300, dated November 20, 1985. Until the NCP is revised to reflect SARA, the procedures and standards for responding to releases of hazardous substances, pollutants and contaminants shall be in accordance with Section 121 of CERCLA and to the maximum extent practicable, the current NCP.

Under its legal authorities, EPA's primary responsibility at Superfund sites is to undertake remedial actions that are protective of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences, including: a requirement that EPA's remedial action, when complete, must comply with applicable or relevant and appropriate environmental standards established under federal and state environmental laws unless a statutory waiver is granted; a requirement that EPA select a remedial action that is cost-effective and that utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and a statutory preference for remedies that permanently and significantly reduce the volume, toxicity or mobility of hazardous wastes over remedies that do not achieve such results through treatment. Response alternatives were developed to be consistent with these Congressional mandates.

A number of potential exposure pathways were analyzed for risk and threats to public health and the environment in the Endangerment Assessment and the Wetlands Assessment included in the Remedial Investigation Report, April, 1989. Guidelines in the Superfund Public Health Evaluation Manual (EPA, 1986) regarding development of design goals and risk analyses for remedial alternatives were used to assist EPA in the development of response actions. As a result of these assessments, remedial response objectives were developed to mitigate existing and future threats to public health and the environment. These response objectives are:

- Eliminate or minimize, to the maximum extent practicable, the threat posed to the public health, welfare, and environment by the current extent of contamination for groundwater, soils, and sediments;
- Eliminate or minimize the migration of contaminants from the soils into the groundwater; and
- Meet federal and state Applicable or Relevant and Appropriate Requirements (ARARs).

B. Technology and Alternative Development and Screening

CERCLA, the NCP, and EPA guidance documents, including, "Guidance on Feasibility Studies Under CERCLA," dated March, 1988, and the "Interim Guidance on Superfund Selection of Remedy" [EPA Office of Solid Waste and Emergency Response (OSWER) Directive No. 9355.0-19 (December 24, 1986)], set forth the process by which remedial actions are evaluated and selected. In accordance with these requirements and guidance documents, treatment alternatives were developed for the site ranging from an alternative that, to the degree possible, would eliminate the need for long-term management (including monitoring) at the site to alternatives involving treatment that would reduce the mobility, toxicity, or volume of the hazardous substances as their principal element. In addition to the range of treatment alternatives, a containment option involving little or no treatment and a no-action alternative were developed in accordance with Section 121 of CERCLA.

Section 121 (b)(1) of CERCLA presents several factors that, at a minimum, EPA is required to consider in its assessment of alternatives. In addition to these factors and the other statutory directives of Section 121, the evaluation and selection process was guided by the EPA document "Additional Interim Guidance for FY 87 Records of Decision" dated July 24, 1987. This document provides direction on the consideration of SARA cleanup standards, and sets forth nine factors that EPA should consider in its evaluation and selection of remedial actions. The nine factors are:

1. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs);
2. Long-term Effectiveness and Permanence;
3. Reduction of Toxicity, Mobility or Volume;
4. Short-term Effectiveness;
5. Implementability;
6. Community Acceptance;
7. State Acceptance;
8. Cost; and
9. Overall Protection of Human Health and the Environment.

Sections 4.1 and 4.2 of the FS identified, assessed and screened technologies based on implementability, effectiveness, and cost. These technologies were combined into source control (SC) and management of migration (MM) alternatives. Section 4.3 in the FS presented the remedial alternatives developed by combining the technologies identified in the previous screening process in the categories required by OSWER Directive No. 9355.0-19. The purpose of the initial screening was to narrow the number of potential remedial actions for further detailed analysis while preserving a range of options. Each alternative was then evaluated and screened in Section 4.4 of the FS. In summary, of the eighteen source control and nine management of migration remedial alternatives screened in Chapter 4, twelve source control and seven management of migration alternatives were retained for detailed analysis. Tables 4-10, 11 and 12 of the FS identify the alternatives that were retained through the screening process, as well as those that were eliminated from further consideration.

IX. DESCRIPTION/SUMMARY OF THE DETAILED AND COMPARATIVE ANALYSIS OF ALTERNATIVES

This section presents a narrative summary and brief evaluation of each alternative according to the evaluation criteria described above. A detailed tabular assessment of each alternative can be found in Tables 5-3, 5-4, and 5-5 of the FS.

A. Source Control (SC) Alternatives Analyzed

The source control alternatives analyzed for the site have been subdivided into soil (SL) or sediment (SD) alternatives and include minimal no action alternatives (SL #1 and SD #1); disposal of contaminated soils at an off-site landfill (SL #3); on-site incineration (SL #5); on-site mechanical aeration (SL #6); in-situ vacuum extraction (SL #7); in-situ soil flushing (SL #8); containment of sediments with an impermeable cap (SD #3);

containment of sediments with a permeable cap (SD #4); disposal of contaminated sediments at an off-site landfill (SD #5); on-site incineration of contaminated sediments (SD #7); and on-site sediment washing (SD #8).

A description of each source control alternative is presented below. The six soil alternatives are described, followed by the six sediment alternatives.

SL #1
No Action

Analysis of the No Action alternative is required by the NCP and is included for comparison with other remedial alternatives. Under this alternative, no action would be taken to remediate contaminated soils at the South Municipal Well site. A No Action alternative would be selected only if the site posed an acceptable risk to public health and the environment, and the remedial objectives could be attained with no further response. An eventual decrease in soil contaminant concentrations would result from the infiltration of rainwater and fluctuation of groundwater levels, thereby causing VOC contaminants to leach from the soil. However, some contaminants would adhere to soil particles rather than migrate into the groundwater, preventing soils from becoming completely "clean" with the no action alternative. In addition, a large percentage of the most highly contaminated soils are covered with either pavement or the NHBB facility, impeding the infiltration of rainwater and subsequent leaching of soil contaminants.

The No Action alternative would not decrease risks to human health and the environment associated with the contaminated soils over the short-term and it would not be protective of human health and the environment. ARARs for drinking water would not be met due to the continued leaching of contaminants from soils to groundwater. Without remediation, soil contaminants will continue to migrate into the groundwater at the site, increasing the time needed to achieve target groundwater contaminant concentrations beyond the foreseeable future. This alternative would neither provide a permanent solution to Site contamination, nor reduce the mobility, toxicity, or volume of contaminants.

SL #3
Disposal of Contaminated Soils at an Off-Site Landfill

For this alternative, contaminated soils would be disposed in an off-site landfill which complies with the requirements of the Resource Conservation and Recovery Act (RCRA). Approximately 7500 cubic yards of contaminated soil would be excavated from the vicinity of the northeast corner of the NHBB facility as well as the areas near outfall 002 and the GZ-105 wells. These soils would then be transported to a permitted RCRA landfill for disposal.

Since contaminants would be permanently removed from the site under this alternative within two months, the long-term effectiveness of the remedy at the Site would be achieved and all ARARs would be met. However, excavation of all contaminated soils above the water table, including soils under the NHBB building, would pose significant problems of maintaining the structural integrity of the building, thus making implementation of this alternative not practicable. Also, the remedy would present a slight increase in risk to the community during the period of remedial action due to the transport of hazardous waste off-site. In addition, excavating all contaminated soils could potentially release VOCs and dust into the air, which would be controlled to the extent practicable during construction activities. This alternative moves waste from one site to an off-site landfill, where the long-term effectiveness of the landfill is uncertain, and it does not reduce mobility, toxicity, or volume of the contaminants or the contaminated media.

Estimated Period of Remediation: 2 months
Estimated Capital Cost (net present worth): $4,021,718
Estimated Total Cost (net present worth): $4,021,718

SL #5
On-Site Incineration

On-site incineration of contaminated NHBB soils would involve excavating approximately 7500 cubic yards of soil, as in SL #3. The soils would be treated on-site with a mobile incinerator, and the treated material would be replaced in excavated areas, and covered with clean fill. Following these activities, the excavated areas would be seeded if not under the building or parking areas.

Since contaminants would be treated to achieve target levels under this alternative within six months, the long-term effectiveness of the remedy would be achieved and all ARARs would be met. However, excavation of all contaminated soils above the water table, including soils under the NHBB building, would pose significant problems of maintaining the structural integrity of the building, thus giving this alternative a very low implementability rating. Potential risks to the community, site workers, and the environment associated with the operating incinerators would be controlled by the use of appropriate technologies and control devices. In addition, excavating all contaminated soils could potentially release VOCs and dust into the air, which would be controlled to the extent practicable during construction activities. Incineration technology is readily available and permanently destroys 99.99% of the contaminants.

Estimated Period of Operation: 6 months
Estimated Capital Cost (net present worth): $4,355,078
Estimated Total Cost (net present worth): $4,355,078

SL #6

On-Site Mechanical Aeration

On-site mechanical aeration involves excavating approximately 7500 cubic yards of contaminated soils, as in SL #3 and #5. The excavated soils would be treated on-site with mechanical aeration, which transfers volatile organics from the soil into the air stream by physically mixing the soils in the presence of an induced air flow. Excavation and replacement activities parallel those described in SL #5 and, therefore, will not be discussed further here.

Mechanical aeration is implementable and offers short-term and long-term effectiveness. In addition, all ARARs would be met and the alternative would achieve a permanent reduction in toxicity, mobility and volume of contaminants. However, excavation of all contaminated soils above the water table, including soils under the NHBB building, would pose significant problems of maintaining the structural integrity of the building, thus giving this alternative a very low implementability rating. Potential risks to the community, site workers, and the environment associated with air emissions from the mechanical aerators would be controlled by the use of appropriate technologies and control devices. In addition, excavating all contaminated soils could potentially release VOCs and dust into the air, which would be controlled to the extent practicable during construction activities.

Estimated Period of Performance: 9 months
Estimated Capital Cost: $2,218,404
Estimated Operation and Maintenance Costs (net present worth): $443,025
Estimated Total Cost (net present worth): $2,661,429

SL #7

In-Situ Vacuum Extraction

This is the preferred alternative for soil remediation and is described in Section X., The Selected Remedy.

SL #8

In-Situ Soil Flushing

Soil flushing would inject washing agents (water, steam, or surfactants) into areas of soil contamination, and the injected fluids and contamination would be extracted for treatment and recycling. The fluids would mobilize the soluble VOCs which are adsorbed to soil particles. The washing solution would then be extracted via an extraction well, treated, and reinjected to form a closed loop continuous flushing system. Thus, soil flushing must be considered in connection with groundwater remediation, since extraction of flushing solutions will include concurrent extraction of groundwater. Therefore, the design of this system would include groundwater remediation considerations.

In-situ soil flushing may be effective in providing a long-term, permanent solution. Upon implementation, adverse impacts to human health or the environment, such as dust emissions during installation of injection and extraction wells, could be controlled. Furthermore, the remedy would comply with all ARARs when the soil cleanup levels are reached, and meet the statutory preference for on-site remediation and for alternatives that significantly and permanently reduce the toxicity, mobility or volume of contaminants. The short-term effectiveness in reaching target soil cleanup levels is uncertain, with an estimated 30 years of flushing required. This remedy would require long-term operation, maintenance and monitoring in order to ensure effectiveness.

Estimated Period of Operation: 30 years
Estimated Capital Cost: $758,747
Estimated Operation and Maintenance Costs (net present worth): $3,119,605
Estimated Total Cost (net present worth): $3,878,352

SD #1
No Action

Under this alternative, no sediment remediation would be performed. This alternative is included in the FS as required by the NCP to serve as a basis for comparison with other remedial alternatives considered. A No Action alternative would be selected only if the site posed an acceptable risk to public health and the environment, and the remedial objectives could be attained with no further response.

The No Action alternative for remediating the wetlands would not provide overall protection of human health and the environment. This alternative would not reduce the toxicity, mobility, or volume of contaminants, and would not abate the risks to humans and environmental receptors posed by the contaminated sediments. Allowing the sediments to remain in-place will continue to allow the threat that contaminants may migrate off-site by movement of surface waters. Therefore, the alternative would not be effective in addressing the contamination problems in either the long-term or the short-term.

SD #3
Containment of Sediments with an Impermeable Cap

This alternative would cover an estimated 15,800 square feet of contaminated sediments located in on-site wetlands with a multi-layered impermeable cap. Contaminated sediments are located in an area of groundwater fluctuation, and are, at times, saturated and even covered with water. Although impermeable capping would eliminate rainwater infiltration and subsequent leaching, it would have no effect on leaching as a result of water table fluctuations. Impermeable capping would isolate contaminated sediments and would eliminate risks to human health and the environment associated with direct contact with and ingestion of contaminated sediments. This alternative would also stop erosional transport of contaminants. A fence would be erected around the cap to prevent public access to the area, and the property deed would be amended to indicate that these areas are never to be excavated.

The design of the impermeable cap would conform to the RCRA landfill closure requirements. EPA's guidance under RCRA recommends that caps be a three-layered system consisting of an upper vegetative layer, underlain by a drainage layer over a low-permeability layer (US EPA, 1982). The cap would function by diverting infiltrating liquids from the vegetative layer through the drainage layer and away from the underlying waste materials. Because the sediments would be capped in-place, no liner or leachate collection system would be constructed.

Capping would be protective of human health and the environment, but its effectiveness over both the short- and long-terms is uncertain. While capping would isolate contaminants, construction of the cap could adversely affect the environment in the short-term by re-suspending contaminated sediments and permitting migration of site contaminants. It may be possible, however, to minimize re-suspension of contaminated sediments if cap construction is timed to take place during a period when the water table is low. In addition, a cap would effectively eliminate portions of the wetlands, change surface water and groundwater flow patterns, and diminish the beneficial aspects of the wetlands. Finally, the cap would be constructed in the 100-year flood zone and would be partially submerged. In such a situation, where the cap is subject to constantly changing conditions and erosion, this alternative presents long-term management problems to monitor the cap as necessary to avoid failure of the containment and the release of contaminants. Since other practicable and more protective alternatives exist which would result in less harmful impacts to the wetlands and floodplain, this alternative does not meet the wetland and floodplain ARARs.

Estimated Period of Operation: 30 years
Estimated Capital Cost: $323,923
Estimated Operation and Maintenance Costs (net present worth): $207,736
Estimated Total Cost (net present worth): $531,659

SD #4
Containment of Sediments with a Permeable Cap

This alternative, as with SD #3, would cover approximately 15,800 square feet of contaminated sediments, except that this alternative would utilize a permeable cap. Thus, it would not eliminate infiltration of rainwater through contaminated sediments beneath the cap.

Capping would be protective of human health and the environment, but its effectiveness over both the short- and long-terms is uncertain. While capping would isolate contaminants, construction of the cap could adversely affect the environment in the short-term by re-suspending contaminated sediments and permitting migration of site contaminants. It may be possible, however, to minimize re-suspension of contaminated sediments if cap construction is timed to take place during a period when the water table is low. In addition, a cap would effectively eliminate portions of the wetlands, change surface water flow patterns, and diminish the beneficial aspects of the wetlands. However, since the cap is permeable, the impact on groundwater flow patterns will be much less than that of SD #3. Finally, the cap would be constructed in the 100-year flood zone and would be partially submerged. In such a situation, where the cap is subject to constantly changing conditions and erosion, this alternative presents long-term management problems to monitor the cap as necessary to avoid failure of the containment and the release of contaminants. Since other practicable and more protective alternatives exist which would result in less harmful impacts to the wetlands and floodplain, this alternative does not meet the wetland and floodplain ARARs.

Estimated Period of Operation: 30 years
Estimated Capital Cost: $153,241
Estimated Operation and Maintenance Costs (net present worth): $236,790
Estimated Total Cost (net present worth): $390,031

SD #5
Disposal of Contaminated Sediments at an Off-Site Landfill

This is the preferred alternative for sediment remediation and is described in Section X., The Selected Remedy.

SD #7
On-Site Incineration

On-site incineration would involve dredging or excavating (over the same area, 15,800 square feet, that would be remediated in SD #3, #4, and #5) an estimated 1170 cubic yards of sediments contaminated above the sediment target cleanup levels from the wetlands. The sediments would be incinerated to remove hazardous PCB and PAH contaminants. The treated materials would be mixed with clean fill, and replaced in excavated areas of the wetlands.

This alternative would be protective of human health and the environment and reduce the toxicity, mobility, and volume of organic contaminants by permanently destroying them. Incineration technology is technically feasible and implementable. However, given the small volume of sediments, the limited availability of mobile incinerators and their extended start-up time, the on-site incineration alternative would be practicably implementable only if the selected soil remedial action had been on-site incineration. Its implementation could present potential adverse human health and ecological impacts from excavating and/or dredging sediments from the wetlands by creating the potential for re-suspending contaminated sediments and permitting migration of site contaminants. It may be possible, however, to minimize re-suspension of contaminated sediments if cap construction is timed to take place during a period when the water table is low. In addition, excavation of the sediments would destroy portions of the wetlands. However, the excavation could be performed in a manner that minimizes, to the extent feasible, impacts on and disturbance of the wetlands. Finally, the remedy would require restoration of the affected wetlands, to the extent practicable.

Estimated Period of Operation: 2 months
Estimated Capital Cost: $730,339
Estimated Total Cost (net present worth): $730,339

SD #8
On-Site Sediment Washing

This alternative would involve dredging or excavating (over the same area, 15,800 square feet, that would be remediated in SD #3, #4, #5 and #7) an estimated 1170 cubic yards of sediments contaminated above the sediment target cleanup levels from the wetlands, as described above in SD #7. The only difference is that this alternative would treat the sediments with a washing solution.

Sediments would be passed through a grinder to achieve a uniform grain size prior to treatment. From the grinder, sediments would enter a treatment tank where they would be agitated in a solution of surfactants to remove organic contaminants. Following agitation, liquids would be separated from solids in a centrifugal filter; clean solids would be removed from the filter, and liquids would be placed in a distillation column to separate the organic contaminants from the water. Treated materials would then be replaced in the excavated areas of the wetlands, covered with clean fill, and revegetated to complete restoration of the wetlands.

This alternative would protect human health and the environment from risks currently associated with contaminated site sediments. This alternative is a relatively new technology, and testing will be required to determine the effectiveness of this technique on NHBB sediments and contaminants. If the technology were implementable, the remedy would offer both short- and long-term effectiveness and would be a permanent solution to the contamination problem. In addition, all ARARs would be met and remediation would result in significant reduction in the toxicity and volume of contaminated sediments.

As with SD #7, the implementation of this remedy, however, could present potential adverse human health and ecological impacts from excavating and/or dredging sediments from the wetlands, as discussed in SD #7, by creating the potential for re-suspending contaminated sediments and permitting migration of site contaminants. It may be possible, however, to minimize re-suspension of contaminated sediments if cap construction is timed to take place during a period when the water table is low. In addition, excavation of the sediments would destroy portions of the wetlands. However, the excavation could be performed in a manner that minimizes, to the extent feasible, impacts on and disturbance of the wetlands. Finally, the remedy would require restoration of the affected wetlands, to the extent practicable.

Estimated Period of Operation: 8 months
Estimated Capital Cost: $750,290
Estimated Operation and Maintenance Costs (net present worth): $377,031
Estimated Total Cost (net present worth): $1,127,321

B. Management of Migration (GW) Alternatives Analyzed

Management of migration alternatives address contaminants in groundwater that have migrated from the original source of contamination. At the South Municipal Water Supply Well Site, contaminants have migrated from the vicinity of the New Hampshire Ball Bearings facility northeasterly towards Noone Pond. Experience at the Site has shown that pumping of the South Well can draw groundwater with these contaminants into the well. The management of migration alternatives evaluated for the Site include a minimal no action with monitoring alternative (GW #1); groundwater extraction with on-site air-stripping (GW #3); groundwater extraction with GAC (GW #4); well-head treatment (South Well) with air stripping (GW #6); development of an alternate water supply (GW #7); groundwater extraction with a radial collector well with on-site air stripping (GW #8); and groundwater extraction (accelerated) with on-site air stripping (GW #9).

GW #1
No Action

Analysis of the No Action alternative is required by the NCP and is included in the FS for comparison with other remedial alternatives. A No Action alternative would be selected only if the site posed little or no risk to public health and the environment. Under this alternative for the South Municipal Well site, no action would be taken to remediate contaminated groundwater at the site. The contaminant plume would eventually attenuate and contaminant concentrations would decrease, but groundwater contaminant levels would not fall to within the target cleanup levels for drinking water for more than 100 years.

The No Action alternative does not provide overall protection of public health and the environment. Groundwater would not reach drinking water quality ARARs in the foreseeable future. It does not reduce the toxicity, mobility, or volume of contaminants in a reasonable amount of time and would permit the contamination to spread further in the regional groundwater aquifer. No action would not provide a permanent solution to groundwater contamination in the short-term, and would be ineffective in attaining remedial objectives in the long-term.

GW #3

Groundwater Extraction with On-Site Air Stripping

This alternative would involve the extraction and treatment of groundwater from both near the NHBB building and the dilute plume, and subsequent discharge of the treated water. Groundwater from the northeast corner of the NHBB facility (including the highly contaminated GZ-4 area), where groundwater contaminant concentrations are highest, would be extracted at a rate of approximately 200 gallons per minute (gpm). An additional groundwater extraction system, also capable of extracting approximately 200 gpm, would be installed to draw groundwater from the area of the dilute plume. This dilute plume system would extract contaminants that have already migrated beyond the NHBB property, and would provide hydraulic control of the dilute portion of the plume.

Extracted groundwater from the area near the NHBB building would be treated in packed column air strippers, with the addition of phase separation prior to air stripping for the more contaminated GZ-4 area groundwater. Under this alternative, the treated water from the air strippers would be discharged to an infiltration trench upgradient of the contaminated NHBB plume in order to enhance removal efficiencies.

A second air stripping system would be installed near the extraction wells located in the dilute portion of the plume. Due to the low contaminant concentrations in the groundwater in this area, phase separation and pretreatment would not be required prior to air stripping. Water effluent would be discharged to an infiltration trench installed between the second air stripping treatment system and the South Well. This second infiltration trench would provide extra protection for the South Well by creating a more positive hydraulic barrier between the contaminant plume and the well.

As an element of extracting contaminants near the northeast corner of the NHBB building, it may be necessary to implement technologies to enhance contaminant removal and to address the presence of free phase solvents in the saturated zone of this area. Two potentially applicable techniques are cyclic pumping and steam injection. Either or both of these technologies could be used in conjunction with the treatment system described above, and are detailed in the FS.

The time estimate for accomplishing groundwater remediation would be approximately 19 to 32 years for the NHBB area groundwater and approximately 15 to 30 years for the dilute plume. The restoration time is contingent upon treatment of contaminated soils to eliminate further migration of VOCs into the groundwater. The ranges presented reflect the uncertainties inherent in estimating various aquifer parameters. These uncertainties would be clarified during design studies. Periodic system and groundwater sampling would be conducted to monitor contaminant concentrations and to assess the effectiveness of site remediation.

The implementation of this remedial alternative would have no adverse impacts to the community. Adverse environmental impacts and risks to site workers could be controlled by implementation of appropriate safety measures and control technologies, as described in the FS. This alternative would provide protection of public health and the environment, and the groundwater would comply with all drinking water ARARs upon attainment of the groundwater cleanup levels. The remedy would permanently reduce mobility, toxicity, and volume of groundwater contaminants, and the services and technologies necessary for its implementation are readily available. Once the groundwater is restored, this alternative would be effective in the long-term and would be a permanent remedy. Its implementation would, however, introduce a potential change to the groundwater/wetlands relationship, but only causing minimal effects on the nearby wetlands areas.

The primary problem with this alternative is length of time necessary to restore the groundwater to drinking water quality. The speed of restoration is dependant, in part, on the rate at which contaminated groundwater is pumped from the aquifer for treatment. This alternative would not permit use of the untreated groundwater for 15 to 32 years, which could be shortened if the rate of extraction and treatment is increased. Therefore, this alternative would not achieve the remedial objective of restoring the groundwater in the shortest period of time practicable.

Estimated Period of Operation: 15 - 32 years
Estimated Capital Cost: $2,067,039
Estimated Operation and Maintenance Costs (net present worth): $6,193,965
Estimated Total Cost (net present worth): $8,261,004

GW #4
Groundwater Extraction with GAC

This alternative involves extraction of contaminated groundwater as described in GW #3, with the only significant difference being the method of treatment, carbon adsorption.

Under this alternative, the water extracted from the NHBB area and the dilute portion of the plume would be pumped to separate activated carbon adsorption treatment systems, located near the extraction wells. VOCs would bind to the carbon as the water moves through the system. The contaminated carbon would be sent to a licensed off-site treatment facility for regeneration. Since the contaminants are permanently removed from groundwater during carbon adsorption, the treatment is irreversible. The treated water would be piped to infiltration trenches for discharge as in GW #3.

As with GW #3, the implementation of this remedial alternative would have no adverse impacts to the community. Adverse environmental effects and risks to workers could be controlled by implementation of appropriate safety measures and control technologies, as detailed in the FS. Its implementation would, however, introduce a potential change to the groundwater/wetlands relationship, but only causing minimal effects on the nearby wetlands areas. Treatment of contaminated groundwater with carbon adsorption is effective in both the short and long terms, and would be a permanent remedy. This treatment would reduce contaminant concentrations in the dilute plume groundwater to the cleanup target levels. The time estimate for accomplishing these target levels is the same as for GW #3, contingent upon treatment of contaminated soils to eliminate further migration of VOCs into the groundwater.

This remedial alternative reduces the toxicity, mobility, and volume of contaminants and of contaminated media, and complies with all ARARs. Carbon adsorption has been shown to be an effective technology for removing VOCs from groundwater, and the services and technologies necessary for its implementation are readily available.

One difference between this treatment approach and the air stripping approach of GW #3 is that the carbon would have to be maintained, presenting the need for long-term management of treatment residuals. Maintaining the activated carbon increases the costs of this alternative beyond the costs of GW #3. However, the primary problem with this alternative, as with GW #3, is length of time necessary to restore the groundwater to drinking water quality. The speed of restoration is dependant, in part, on the rate at which contaminated groundwater is pumped from the aquifer for treatment. This alternative would not permit use of the untreated groundwater for 15 to 32 years, which could be shortened if the rate of extraction and treatment is increased. Therefore, this alternative would not achieve the remedial objective of restoring the groundwater in the shortest period of time practicable.

Estimated Period of Operation: 15 - 32 years
Estimated Capital Cost: $1,485,940
Estimated Operation and Maintenance Costs (net present worth): $7,266,602
Estimated Total Cost (net present worth): $9,752,542

GW #6
Well-Head Treatment (South Well) with Air Stripping

This alternative would directly treat groundwater for the Peterborough public water supply through well-head treatment of water extracted by the South Municipal Well. Water would be extracted at 450 gallons per minute (gpm), which is the rate at which water was pumped prior to discovery of the contamination, and treated with packed column air stripping. Pumping from the South Well at 450 gpm, 24 hours per day, is expected to draw the contaminant plume into the well. Contaminant concentrations should not exceed 200 parts per billion (ppb) initially, but continued pumping without treatment or isolation of the GZ-4 area soils and groundwater would draw increasingly higher contaminant concentrations into the well.

A single stripping tower approximately five feet in diameter and 20 feet high would receive the groundwater directly from the well. Treated water from the tower would then enter a holding tank from which it would be pumped to the public water distribution system. Periodic monitoring of the treated water would be performed to verify the efficiency of contaminant removal prior to public distribution of the treated water. In addition, groundwater monitoring between the current contaminant plume and the South Well would be performed to provide information on the behavior of the plume under full South Well pumping conditions.

Well-head treatment, by itself, would not remediate Site groundwater contamination and would not restore the aquifer to drinking water quality. Although it would ensure that the public water supply is treated to remove any contaminants prior to distribution, well-head treatment would not treat the highly contaminated groundwater in the area of GZ-4 and would allow contaminant migration to continue. For this reason, potential risks to human health and the environment following its installation and operation would be substantial. While the excessive risks to humans associated with ingestion of contaminated groundwater from the South Well would be substantially decreased due to the direct treatment of the well water, well-head treatment does not protect against risks from the development of private wells in the contaminated aquifer and use of the contaminated water.

This alternative would be effective in the short-term for providing safe public water supplies. Implementation would present minimal and controllable adverse environmental impacts, and no adverse impacts to the community or site workers. Although this treatment would meet all ARARs directly pertaining to the treatment of South Well water, it would not reduce the levels of contamination to meet drinking water standards throughout the aquifer. The remedy would not restore what had been a source of drinking water prior to the contamination. This alternative, therefore, would not result in significant and permanent reduction in the toxicity, mobility, or volume of contaminants or of contaminated media. Since the contaminated water would continue to be drawn to the well for treatment, the well-head treatment would be required for a long period of time and the remedial action would incur substantial costs to operate and maintain.

Estimated Period of Remediation: 30 years
Estimated Capital Cost: $925,466
Estimated Operation and Maintenance Costs (net present worth): $2,414,311
Estimated Total Cost (net present worth): $3,339,777

GW #7

Development of an Alternate Water Supply

Under this alternative, an alternate water supply would be provided to the South Municipal Well site community. The evaluation of this alternative was based on the Whitman and Howard report (1985) prepared for the Town by Whitman and Howard Engineering, Inc. The 1985 report determined that there are several potential well sites in the Town of Peterborough, in addition to the wells currently supplying the town with water. Areas defined to have "major groundwater potential" in this report, and which have not yet been developed as town water supplies, include the Grove Street Aquifer, the northern swamp, and the Bogle Road areas.

Development of an alternate water supply would require testing of the potential aquifer areas to determine whether water yields are sufficient to meet the Town's needs, and to verify that groundwater from these areas is potable. Following testing, a well would be installed with the appropriate piping to connect the new water supply to the existing Town system for distribution to the south end of Town. Both the testing and the well and piping installation would be implemented easily and would present no technical difficulties.

With this alternative, short-term effectiveness would be achieved with minimal and controllable adverse impacts to site workers, the community, and the environment. This alternative would be effective in the short-term for providing drinking water from the aquifer and providing safe public water supplies. Implementation would present minimal and controllable adverse environmental impacts, and no adverse impacts to the community or site workers. However, this approach does not protect against risks from the development of private wells in the contaminated aquifer and use of the contaminated water.

This alternative would not attain all ARARs directly pertaining to drinking water in the aquifer and the remedy would not restore what had been a source of drinking water prior to the contamination. This alternative, therefore, would not result in significant and permanent reduction in the toxicity, mobility, or volume of contaminants or of contaminated media. Although this alternative would significantly reduce risks to human health and the environment by providing a new, clean water supply, it would not address the contaminant migration that will continue from the GZ-4 area.

Estimated Capital Cost (net present worth): $641,118
Estimated Total Cost (net present worth): $641,118

GW #8

Groundwater Extraction with a Radial Collector Well with Air Stripping

This alternative is similar to GW #3, the only difference being the method of groundwater extraction near the northeast corner of the NHBB building. At that location, a single concrete caisson would be installed. From the caisson, screened wells would be extended radially at a chosen depth. These radial wells would be capable of extracting groundwater from the most contaminated portion of the aquifer at a rate of 200-300 gallons per minute. This method of extraction is theoretically more efficient than extraction from conventional wells since the horizontal screening allows groundwater to be removed from a particular depth at high volume. The ability to extract high volumes of groundwater from a single depth allows placement of horizontal wells at several points within the most highly contaminated "layer" of the aquifer, increasing the efficiency of contaminant removal. In addition, high volume extraction from a single depth would increase the groundwater flow rate through the extraction layer, presumably enhancing contaminant removal. Installation of four radial wells, extending from the caisson at a depth of 55 feet, is expected to be sufficient to treat the contamination. Dilute plume extraction and treatment will still be necessary. The time estimate for accomplishing groundwater remediation would be the same as for GW #3. The rate of restoration would be contingent upon treatment of contaminated soils to eliminate further migration of VOCs into the groundwater. Periodic system and groundwater sampling would be conducted to monitor contaminant concentrations and to assess the effectiveness of site remediation.

The implementation of this remedial alternative would have no adverse impacts to the community. Adverse environmental impacts and risks to site workers could be controlled by implementation of appropriate safety measures and control technologies, as described in the FS. This alternative would provide good overall protection of public health and the environment, and the groundwater would comply with all drinking water ARARs upon attainment of the groundwater cleanup levels. The remedy would permanently reduce mobility, toxicity and volume of groundwater contaminants, and the services and technologies necessary for its implementation are readily available. Once the groundwater is restored, this alternative would be effective in the long-term and would be a permanent remedy. The rate of groundwater remediation would be contingent upon the elimination of contaminant migration from the soils in the GZ-4 area. The remedy would be permanent upon completion of groundwater remediation.

Estimated Period of Operation: 15 - 32 years
Estimated Capital Cost: $2,909,827
Estimated Operation and Maintenance Costs (net present worth): $6,193,965
Estimated Total Cost (net present worth): $9,103,792

GW #9
Groundwater Extraction (accelerated) with On-Site Air Stripping

This is the preferred alternative for groundwater remediation and is described in Section X., The Selected Remedy.

X. THE SELECTED REMEDY

The selected remedial action is a comprehensive approach consisting of source control components for soils and sediments, and a management of migration component listed in Section VII.

A. Description of the Selected Remedy

1. Remedial Action Objectives/Cleanup Goals

The selected remedy was developed to satisfy the following remedial objectives which will guide the design of the remedy and be used to measure the success of the remedy.

a. Soil. Specific soil target cleanup levels will be met in the remedial action in order to reduce contaminant levels to eliminate the potential migration of contaminants from the soils into the groundwater at levels exceeding groundwater cleanup target levels.

The target soil cleanup levels are listed below for each of the groundwater indicator chemicals. Those contaminants which are also indicator chemicals for soils are shown in bold.

Contaminant	Target Level (ppb)
Tetrachloroethylene	4.5
1,1,1-Trichloroethane	76
Trichloroethylene	1.5
1,1-Dichloroethylene	1.1
Toluene	1500
1,1-Dichloroethane	60
Vinyl Chloride	0.28

The excess cancer risk associated with direct contact and ingestion of soils containing these target levels is expected to be 2.92×10^{-10}, a level which is more protective of human health and the environment than the risk range generally considered by EPA to be protective.

The soil target cleanup levels set forth in this document are, in part, based on estimates of soil characteristics developed during the RI/FS. During the design of the remedy, additional soil characterization will take place that could provide better information from actual field data. Where appropriate, if analysis of new data indicates that the parameters used in the model should be adjusted to reflect actual field conditions, the soil target cleanup levels may be adjusted, and an explanation of significant differences issued, if appropriate.

b. Sediments. Specific sediment target cleanup levels will be met in the remedial action in order to:

- Eliminate, to the maximum extent practicable, the potential exposure of humans or environmental receptors to site related contaminants;
- Prevent the potential migration of contaminants from the sediments, including migration during implementation of the remedy; and
- Implement the remedy in a manner that minimizes disturbance of the wetlands and restores the wetlands, to the extent practicable.

To meet these objectives, sediments in the wetlands contaminated with PCBs at levels greater than 1 ppm or with PAHs at levels greater than 1.1 ppm will be excavated and disposed off-site. Further, the remedy selected will include measures to prevent the potential migration of contaminated sediments during implementation. The remedy will also include provisions to minimize destruction of the wetlands area and to ensure that damaged areas in the wetlands will be restored to the maximum extent practicable.

The excess cancer risk resulting from the target sediment cleanup levels would be 2.9×10^{-7} for PCBs and 1×10^{-6} for PAHs, for a total risk of approximately 1.3×10^{-6}, which is protective of human health.

c. Groundwater. Specific groundwater target cleanup levels will be met in the remedial action in order to:

- Restore the contaminated portion of the aquifer, including all of the "dilute plume" area, to drinking water quality (MCLs) in as short a time as practicable;
- Prevent the migration of contaminated groundwater into uncontaminated portions of the aquifer;
- Implement a groundwater extraction system which creates a barrier between highly contaminated groundwater in the NHBB area and the dilute plume area, so that use of the portion of the aquifer affected by the dilute plume could occur independent of the restoration of the NHBB area; and

- Implement a groundwater extraction system which creates a barrier between the dilute plume area and the South Municipal Well, to permit restricted use of the South Well in the event of water supply emergencies prior to full attainment of groundwater cleanup target levels in the dilute plume.

The target ground water cleanup levels are listed below for each of the groundwater indicator chemicals.

Contaminant	Target Level (ppb)
Tetrachloroethylene	5
1,1,1-Trichloroethane	200
Trichloroethylene	5
1,1-Dichloroethylene	7
Toluene	2000
1,1-Dichloroethane	810
Vinyl Chloride	2

Of the indicator chemicals, tetrachloroethylene is the most resistant to treatment based on relative water solubilities and soil adsorption coefficients. Therefore, it is expected that concentrations of all other indicator chemicals will decrease proportionally to, or more quickly than concentrations of tetrachloroethylene. Thus, at the conclusion of the groundwater remediation, concentrations of each groundwater indicator chemical will be at or below its target level. The carcinogenic risks associated with post-remediation indicator chemical concentrations are expected to range from 7.7×10^{-6} to 1.0×10^{-5}. The target levels were established in order to remediate the groundwater so the aquifer may once again be a source of drinking water for the Town of Peterborough. The target levels for groundwater are based on Maximum Contaminant Levels (MCLs) established under the federal Safe Drinking Water Act and the corresponding standards of the State of New Hampshire, except for tetrachloroethylene and 1,1-dichloroethane. The target level for tetrachloroethylene is based upon a proposed MCL while the target level for 1,1-dichlcrothane is based upon the New Hampshire Department of Public Health Service consumption advisory for water supplies, since no MCL has been promulgated.

It is estimated that the groundwater target cleanup levels under the remedy should be attained in the dilute plume in 7.5 years at a groundwater extracion rate of 400 gpm. Target levels for the groundwater in the NHBB area, near the GZ-4 well, should be attained in 19 to 32 years at a groundwater extraction rate of 200 gpm. However, groundwater in that area may not achieve target levels within 19 to 32 years due to the difficulties in extracting such highly contaminated groundwater. The rate of restoration of this remedy, as set forth in this document, is calculated, in part, based on estimates of aquifer and soil characteristics developed during the RI/FS. If during the preliminary design, it is determined that the extraction rate evaluated in the FS (400 gpm in the dilute plume and 200 gpm in the NHBB area) and the number and configuration of extraction wells specified for each area will not result in a restoration time similar to that specified above, the extraction rates, and number and configuration of wells may be adjusted.

2. Description of Remedial Components

After evaluating all of the feasible alternatives, EPA is selecting a remedy with six components to address soil, sediment, and groundwater contamination at the Site:

a. SL #7 In-Situ Vacuum Extraction of Contaminated Soils

An in-situ vacuum extraction system (VES) will be installed to reduce contaminant levels in the 7500 cubic yards of on-site soils that are above target cleanup levels. Since the treatment is performed in-situ (i.e., in place), no excavation and subsequent backfilling of treated soils will be necessary. The in-situ vacuum extraction will be used to remove VOCs from contaminated soils above the water table. VES is a relatively new technology that has been demonstrated at the Groveland Wells Superfund Site in Groveland, Massachusetts. It is described briefly, below.

A vacuum pump extracts subsurface organic contaminants as vapors through perforated pipes buried just above the water table. A vacuum is developed within the soil matrix in order to induce air and contaminant flow through the pore structure. As soil gas migrates through the pore spaces, mass transfer between the trapped residual unsaturated contamination and the air occurs, releasing the contamination. This facilitates contaminant removal without soil excavation. Reports indicate significant quantities of contamination can be removed in this manner in a relatively short time frame.

Vacuum extraction is classified as an active vapor collection system. It consists of vapor extraction wells, vapor collection headers, vacuum blowers or pumps, and vapor collection (condensers) and/or vapor treatment (carbon adsorption) equipment.

Two areas at the Site will be subject to the vacuum extraction system. The depth to ground water in these areas varies from 15 feet at the northeast corner of the NHBB facility to 7 feet in the area near well GZ-105. A maximum area of 7500 square feet is estimated for vacuum extraction. This area will be confirmed through additional soil sampling during a pilot plant study stage of remedial design. As ground water extraction and treatment systems are installed, the ground water depth will drop, allowing for improved efficiencies. Although the length of time for treatment is dependent upon extraction efficiency and actual soil areas to be treated (both of which will be further defined during the pilot plant study stage), the FS estimated that the VES could attain target levels after two years of operation. Continuous monitoring of the off-gases will occur to evaluate the effectiveness of the technology.

This alternative is expected to require relatively little time to implement. Several vacuum wells can be completed by a single crew in a day and collection piping and mechanical equipment can be installed concurrently. No soil excavation is required. Vapor extraction can be started upon completion of the system and immediate removal of contaminants realized.

The extracted gas will contain high levels of volatile organic compounds (VOCs) and moisture. Moisture will be removed by a sloping header followed by a water cooled condenser to remove any remaining moisture and some VOCs. Water for the condenser will be supplied by the ground water treatment system recommended for the management of migration alternative. Moisture collected in the condenser will be returned to the ground water treatment system for treatment. The system provides a high degree of flexibility. Valve adjustments enable the operator to maximize (or minimize) flow from an area. Flow adjustments are made initially so that most of the extracted flow is from the area of highest contamination. As concentrations are found to decrease, adjustments can be made so that most of the flow is directed toward areas having the highest contaminant levels. An activated carbon canister or other pollution control device will be used to clean the air stream before it is discharged to the atmosphere.

b. SD #5 Excavation and/or Dredging with Dewatering of Sediments and Off-Site Disposal

This remedy will remove sediments in the wetlands contaminated with PCBs at levels greater than 1 ppm or with PAHs at levels greater than 1.1 ppm, estimated to total 1170 cubic yards. The excavated sediments will be dewatered, placed in containers, and transported to an off-site, licensed RCRA landfill for disposal.

While PCBs and PAHs have been found in the top six to twelve inches of sediment in this area, approximately 15,800 square feet area of sediments would be dredged/excavated to a depth of two feet to ensure complete removal of contamination. Contaminated sediments are located in an area of water table fluctuation, so that they are at times saturated while, at other times, above the water line. For this reason, sediment removal may take the form of either excavation or dredging.

Since it was determined that wetland sediment contamination was at a level which posed an unacceptable risk to human health and the environment, alternatives were evaluated to address that risk. No practicable remediation alternative exists which would not include construction in the wetlands, however. Therefore, the remedy in the wetlands will be undertaken in such a manner to avoid or minimize the destruction, loss and degradation of site wetlands and to preserve and enhance the natural and beneficial use of wetlands. The work will be performed during low water periods to minimize the need for dredging and the associated potential spread of contaminants to other portions of the wetlands. Controls will be used to isolate the contaminated wetlands and to minimize resuspension and downstream transport of the contaminated sediments. During excavation, monitoring will be conducted in the area and downstream to determine whether unacceptable contaminant transport is occurring.

c. Wetlands Restoration

Following the completion of remedial activities in the wetlands to excavate contaminated sediments, a wetlands restoration program will be implemented. The wetlands restoration program will be designed to return the affected wetland areas to their original conditions, to the maximum extent practicable. Clean fill material will replace the contaminated sediments removed in this component of the remedial action. The fill will be placed such that ground surface contours are returned to those which existed prior to the excavation/dredging so as to maintain the original hydrologic flow patterns. The wetlands will be revegetated with appropriate wetland plants in order to minimize erosion and to provide habitat for indigenous wildlife with a program of transplanting, seeding or some combination thereof. The remedy includes monitoring of the wetlands, and continued restoration activities until the objectives of the wetlands restoration program have been achieved.

d. GW #9 Groundwater Extraction and Treatment with Air Stripping and Carbon Columns for Air Emission Control

This component of the remedy will extract groundwater from the NHBB area plume (including the GZ-4 area plume) and the dilute plume. The extracted water will be treated on-site with air stripping to reduce contaminant levels to drinking water standards, and the treated water will be discharged to groundwater on-site. The groundwater extraction/discharge system for the NHBB area will be designed so as to provide a hydrologic barrier between groundwater in the NHBB area and groundwater in the rest of the aquifer; the groundwater extraction system for the dilute plume area will be designed so as to provide a hydrologic barrier between groundwater in the dilute plume and the South Municipal Well.

The NHBB area groundwater extraction system will consist of conventional extraction wells, located in the vicinity of the northeast corner of the NHBB building and pumping at a total rate of approximately 200 gpm. The extraction system for groundwater in the dilute plume area would consist of groundwater extraction wells, pumping at a rate of approximately 400 gpm. The dilute plume extraction wells will be placed so as to withdraw contaminated groundwater that has migrated from the NHBB area.

Contaminated groundwater extracted by these two extraction systems will be treated on-site by air stripping to reduce contaminant levels in the treated water to the groundwater target cleanup levels. Groundwater from the NHBB area will first pass through a phase separation settlement tank/pretreatment system where dense nonaqueous phase liquid (DNAPL) could separate from solution prior to air stripping. DNAPLs in this tank would be drained off periodically for recycling or disposal. Water which has passed through the phase separation or which is drawn from the dilute plume area will be treated by one or more air stripping systems capable of discharging effluent which will meet State of New Hampshire groundwater discharge limits. The treatment system or systems will consist of stripping towers, holding tanks, and transfer pumps to cycle water through the system. Water treated by the air stripping system will be monitored during the groundwater treatment operation to ensure that the treatment system is effective. Treated effluent will then be pumped to two infiltration trenches. The first infiltration trench will be located upgradient of the extraction wells for the NHBB area to enhance contaminant removals in that area. A second infiltration trench could be installed between the dilute plume and the South Well to provide a more positive hydraulic barrier. It is likely that a portion of the treated flow will be discharged to the Contoocook River. The discharge point or points will be determined in the design phase.

EPA estimates that the extraction and treatment systems will need to operate for 13, 19, and 7.5 years for the NHBB area, GZ-4 area, and dilute plumes, respectively, in order to achieve the groundwater target cleanup levels in all parts of the aquifer. Therefore, the point of compliance for determining whether the groundwater target cleanup levels have been achieved is anywhere in the aquifer.

As discussed above in Section X.A.1.c, the extraction rates and the aquifer restoration times described here are estimates calculated with models. During the design of the groundwater extraction/treatment system, actual field data will be developed and used to refine the modelling results and to determine the optimal rate for extracting and treating groundwater.

Also as noted, the presence of DNAPLs in the NHBB area may lengthen the time necessary to meet target cleanup levels for groundwater located near the NHBB area. As the time estimates for aquifer restoration indicate, the remedy is expected to reach target cleanup levels in the dilute plume area before groundwater in the NHBB area is remediated. This remedy will continue to extract and treat groundwater in the NHBB area until the cleanup targets are achieved in all locations. To account for the different treatment periods, the extraction systems will be designed so as to create a hydrologic barrier between the NHBB area and the rest of the aquifer so as to prevent the migration of contaminants away from the NHBB area. The hydrologic barrier will permit the use of groundwater in the aquifer while the remedy continues to pump and treat contaminated groundwater in the NHBB area.

e. Long-Term Environmental Monitoring

A groundwater monitoring program will be developed for the following purposes:

- to determine the reduction of contaminant concentrations over time;
- to evaluate the effectiveness of the remedial action and attainment of the groundwater target cleanup levels; and
- to ensure that the groundwater contaminant levels in treated effluent do not exceed target cleanup levels.

The details of the groundwater monitoring program will be developed during remedial design and tailored to the specifics of the design. Performance monitoring will be implemented consistent with 40 C.F.R. § 264.100(d), which requires implementation of a monitoring program to assess the effectiveness of a corrective action program. Groundwater monitoring wells may need to be installed in order to ensure that the objectives of the monitoring program are achieved. Selected wells will be monitored on a periodic basis throughout the implementation of the remedy. Groundwater will be monitored quarterly in both the NHBB area and the dilute plume area. All samples will be analyzed for VOCs. Specific analysis parameters may be added or deleted depending on sampling results and observed trends.

All monitoring data will be reviewed and evaluated during the implementation of the remedial action to ensure that response objectives are achieved. Adjustments to the extraction and treatment systems will be implemented to optimize treatment and restoration. Modifications to the remedial action will be considered if the monitoring program shows that the groundwater will not attain the target levels within the period of time specified in this remedy or that remedy is not adequately reducing risks to human health and/or the environment that are posed by exposure to site contaminants.

To the extent required by law, EPA will review the Site at least once every five years after the initiation of the remedial action at the Site if any hazardous substances, pollutants, or contaminants remain at the Site, to assure that the remedial action continues to protect the human health and the environment. EPA will also evaluate risk posed by the Site at the completion of the remedial action (i.e., before the Site is proposed for deletion from the NPL).

f. Institutional Controls, Including Restrictions on Use of the South Municipal Water Supply Well

Since remediation of contaminated groundwater will require several years for completion, this remedy includes institutional controls designed to ensure that groundwater in the zone of contamination will not be used as a drinking water source until MCLs are met. EPA will work with the State and the Town of Peterborough to restrict the use of the South Well and prevent installation of private wells which might draw in contaminated groundwater. The extent of restrictions (up to and including prohibition of use) placed on the use of the South Well is dependent upon the final design of the dilute plume extraction system and therefore must be developed in close coordination with the remedial design.

B. Rationale for Selection

The rationale for choosing each selected alternative which is a part of the selected remedy is based on an assessment of each criterion listed in the evaluation of alternatives section of this document. In accordance with Section 121 of CERCLA, to be considered as a candidate for selection in the ROD, the alternative must have been found to be protective of human health and the environment and able to attain ARARs unless a waiver is invoked. In assessing the alternatives that met these statutory requirements, EPA focused on the other evaluation criteria, including: short term effectiveness; long term effectiveness; implementability; use of treatment to permanently reduce the mobility, toxicity, and volume; and cost. EPA also considered non-technical factors that affect the implementability of a remedy, such as state and community acceptance. Based upon this assessment, taking into account the statutory preferences of CERCLA, EPA selected the remedial approach for the Site.

1. Soil

In-situ vacuum extraction, which was Alternative SL #7 in the FS and the Proposed Plan, represents the best soil remediation alternative when evaluated against the criteria and compared to the other soil remediation alternatives evaluated. This alternative is protective of human health and the environment and meets ARARs; reduces the toxicity, mobility and volume of the contaminants; is implementable; has community and State acceptance; and is cost-effective.

Other alternatives were considered less acceptable for the following reasons. Alternative SL #1, No Action, does not address risks associated with direct contact or from continued migration of VOCs into the groundwater. All of the other alternatives would achieve those remedial action objectives. It is not protective and does not achieve ARARs.

The selected remedy will be more implementable than the alternatives which required excavation of the soils, followed by on- or off-site treatment or disposal. Remediation of contaminated soils under and in close proximity to an operating industrial facility presents special implementation problems related to maintaining the structural integrity of the building. In addition, the costs of the remedial alternatives involving excavation were higher than the selected remedy, but would provide no greater degree of protection or permanence.

The single advantage presented by the excavation alternatives is the greater certainty of long- and short-term effectiveness in meeting soil target cleanup levels at the Site that landfilling, incineration, and mechanical aeration afford. However, EPA believes that vacuum extraction can attain the target levels in soil and, therefore is effective in the long- and short-term. Yet, there is some degree of uncertainty that this innovative technology can achieve site-wide reductions to the very low levels established in this remedy. Therefore, this remedy includes continued evaluation of the effectiveness of vacuum extraction in meeting the target levels, and provides that additional remedial approaches will be evaluated if experience during the remedial action indicates that the remedy is not protective. However, this remedy provides that the vacuum extraction system will continue to operate, even if the target levels are not attained in two years, until another remedy is selected. Another factor that may affect considerations on the effectiveness of vacuum extraction is that during the design of this component of the remedy, additional soil and aquifer characterization may support a recalculation of the model that was used to establish the soil target cleanup levels. An increase or decrease in target levels, as well as experience gained during design of the remedy, may affect considerations whether vacuum extraction continues as an element of the remedy.

After considering the technical complications from implementing soils excavation, and the related increase in remedial costs, with no increase in protectiveness, SL #7 is preferred over alternatives which would require soil excavation (Alternatives SL #3, SL #5, and SL #6).

The other alternative evaluated which would not require excavation, SL #8, In-Situ Soil Flushing, would require approximately thirty years to reach the target cleanup levels, while the selected alternative is expected to take approximately two years. The selected remedy will reduce contaminant levels sooner, so that the soils will not continue to be a source of groundwater contamination, and therefore has greater short-term effectiveness. In addition, SL #8 is estimated to cost more than the vacuum extraction system, which is related in part to the extended remediation time, but the alternative does not provide a more protective or permanent remedy.

2. Sediments

Disposal of Contaminated Sediments at an Off-Site Landfill, the selected remedy for remediating contaminated sediments (Alternative SD #5 in the FS and the Proposed Plan) represents the best wetlands remediation alternative when evaluated against the criteria and compared to the other options which were evaluated. The selected alternative is protective of human health and the environment and meets ARARs; is effective in the long and short terms; is implementable; and has State and community acceptance. While this alternative does not reduce the toxicity or volume of contaminants, containment of the excavated sediments will reduce the mobility of the contaminants. Although the selected remedy is not the least costly alternative evaluated, the excavation and off-site disposal is the most cost-effective approach because it is a protective remedy for which the costs are proportionate to its effectiveness.

Other alternatives were considered less acceptable for the following reasons. Since Alternative SD #1, No Action, does not address risks to humans nor environmental receptors, it is not protective and would not attain the remedial objectives. Alternatives SD #3 and SD #4 both involve capping the contaminated sediments, effectively destroying the wetland areas that are capped and thus, result in non-compliance with ARARs for wetland protection and floodplain management. In addition, the contaminants would remain in place, thereby leaving a potential exposure point for the long term should the capping systems fail and require long-term management. Alternative SD #7, On-Site Incineration, while providing for the treatment of the contaminants, the small amount of sediments needing treatment is likely to limit the availability of the technology and affect the short-term effectiveness of the alternative. While the FS and Proposed Plan indicate that on-site incineration is somewhat less expensive than the preferred sediment alternative, its cost was based upon incineration in conjunction with soil incineration, an alternative rejected because of cost and implementability considerations previously described. On-site sediment washing, SD #8, was rejected because the higher costs would not produce a proportionate degree of effectiveness due to the uncertainties of the effectiveness of this technology to treat Site contaminants.

3. Groundwater

Alternative GW #9 from the FS and the Proposed Plan, Groundwater Extraction and Treatment with Air Stripping and Carbon Columns for Air Emission Control, represents the best groundwater remediation alternative when evaluated against the criteria and compared to the other alternatives. The selected alternative is protective; is effective in the long and short terms; reduces the toxicity, mobility, and volume of contaminants; is implementable; has community and State acceptance; and is cost-effective. Finally, the selected remedy will achieve restoration of the aquifer to drinking water quality in the shortest period of time. Other alternatives were considered less acceptable for the following reasons. Alternative GW #1, No Action, does not address risks to humans nor environmental receptors and was rejected from further consideration. GW #3 and GW #4 are essentially the same as the preferred alternative but with a longer cleanup time for the dilute plume portion of the contamination. The estimated costs of implementing GW #3 and GW #4 are higher than the costs of the selected remedy, primarily because operating the pump and treat systems for a longer period will result in increased costs.

Alternatives GW #6 and GW #7 do not address the environmental risks posed by the contamination in the aquifer and do not restore the aquifer to drinking water quality, thus failing to attain ARARs or the remedial objectives. While each would provide a safe water supply, neither provides for long term protectiveness to public health or the environment. GW #8 is similar to GW #3 and GW #4 in terms of environmental impacts and the rate of aquifer restoration but uses a different groundwater extraction system, a radial well collector system. However, the cost of this system is greater than the selected remedy without providing a faster rate of restoration or a more protective remedy. In addition, application of this technology in remediating hazardous waste in groundwater is untested and may not be implementable.

XI. STATUTORY DETERMINATIONS

The remedial action selected for implementation at the South Municipal Water Supply Well Superfund Site is consistent with CERCLA and, to the extent practicable, the NCP. The selected remedy is protective of human health and the environment, attains ARARs and is cost effective. The selected remedy also satisfies the statutory preference for treatment which permanently and significantly reduces the mobility, toxicity or volume of hazardous substances as a principal element. Additionally, the selected remedy utilizes alternate treatment technologies or resource recovery technologies to the maximum extent practicable.

A. The Selected Remedy is Protective of Human Health and the Environment

The remedy at this Site will permanently reduce the risks presently posed to human health and the environment by exposure to contaminated soils, sediments, and groundwater.

The soil cleanup levels to be attained by this remedy are designed to prevent migration of contaminants into the groundwater at levels which exceed drinking water standards. Preventing further contamination of groundwater at unacceptable levels will also expedite restoration of the aquifer. When contaminant levels reach the soils target cleanup levels, the risks associated with dermal contact and accidental ingestion are protective of human health.
Removal of the PCB and PAH contaminated sediments will reduce the

risks to the wildlife which inhabit the area as well as reducing the risks posed to humans through dermal contact and accidental ingestion. Containment of the contaminated sediments in an off-site landfill meeting RCRA requirements will protect humans and environmental receptors from the threat of contact or bioacculation.

The selected ground water remedy will significantly reduce the risks of ingestion of contaminated groundwater by treating groundwater throughout the affected portion of the aquifer to drinking water standards, which are ARARs at this Site. This remedy will achieve these protective drinking water standards in the shortest period of time of any of the alternatives that were evaluated. In addition, treatment of the air stream will prevent exposure to the removed contaminants by inhalation. Institutional controls will ensure that no exposure to the contaminated groundwater will occur during the implementation of the selected remedy. This combination of elements results in a remedy which is protective of human health and the environment.

B. The Selected Remedy Attains ARARs

This remedy will meet or attain all applicable or relevant and appropriate federal and state requirements that apply to the Site. Environmental laws from which ARARs for the selected remedial action at the South Municipal Water Supply Well Superfund Site are derived include:

Resource Conservation and Recovery Act (RCRA);
Clean Water Act (CWA);
Safe Drinking Water Act (SDWA);
Executive Order 11988 (Floodplain Management);
Executive Order 11990 (Protection of Wetlands);
Fish and Wildlife Coordination Act;
Clean Air Act (CAA);
Occupational Safety and Health Administration (OSHA);
State Superfund Laws; and
State Hazardous Waste Facility Laws.

The following policies, criteria, and guidances have also been considered (TBCs) during the selection of the remedy:

SDWA Maximum Contaminant Level Goals (MCLGs);
CWA Ambient Water Quality Criteria;
OSWER Directive 9355.0-28, Air Stripper Control Guidance; and
State Drinking Water Criteria and Consumption Advisories.

Chemical- and location-specific ARARs are found in Tables 3-1 and 3-2 of the Feasibility Study, respectively. Action-specific ARARs are presented in the Feasibility Study in Tables 5-1 and 5-2. These tables (included in Appendix B) provide a brief synopsis of the requirements and indicate whether the ARAR is applicable, relevant and appropriate, or to-be-considered. A brief narrative summary of the ARARs and TBCs follows.
The principal chemical-specific ARARs are the Maximum Contaminant

Levels (MCLs) established in the Safe Drinking Water Act (40 CFR 141.1 - 141.16) which has been determined to be relevant and appropriate to the site. MCLs were used to help set the groundwater cleanup levels, as well as, the soil cleanup levels. The specific MCLs which are ARARs to be met include: 1,1,1-tricloroethane, 200 ppb; trichloroethylene, 5 ppb; 1,1-dichloroehtylene, 7 ppb; toluene, 2000; and vinyl chloride, 2 ppb. The level set for tetrachloroethylene, 5 ppb, is based upon a proposed MCL which is considered a TBC. In addition, the State of New Hampshire Department of Public Health Service consumption advisories for water supplies, which have been determined to be a TBC, were used in the absence of an MCL for 1,1-dichloroethane in setting site cleanup levels for groundwater and soil. The level to be met is 810 ppb. The Fish and Wildlife Coordination Act has been determined to be a TBC for this Site and comments submitted to EPA by the Fish and Wildlife Service of the U.S. Department of the Interior were used in setting PCB cleanup levels for sediments.

With respect to location-specific ARARs, the Executive Orders concerning wetlands and floodplains are applicable to this Site. Since it was determined that wetland sediment contamination was at a level which posed an unacceptable risk to human health and the environment, alternatives were evaluated to address that risk. No practicable remediation alternative exists which would not include construction in the wetlands, however. Therefore, the remedy in the wetlands will be undertaken in such a manner to avoid or minimize the destruction, loss and degradation of site wetlands and to preserve and enhance the natural and beneficial use of wetlands. Also, the remedy will be implemented in such a manner as to maintain existing flow patterns so as not to impact the floodplain.

In addition, this remedy was selected using EPA guidance on control of air emissions (OSWER Directive 9355.0-28, June 15, 1989) as a TBC for the Site, which is in an ozone non-attainment area. For such an area, the directive indicates the need for control of VOC emissions from Superfund air strippers and soil vapor extraction systems based upon actual emission rates of VOCs.

The principal action-specific ARARs include RCRA standards for the treatment, storage, and disposal of hazardous wastes. These standards are applicable to the design, construction and operation of the groundwater extraction and treatment systems, since those systems will be handling, treating and disposing of hazardous waste and hazardous waste constituents. RCRA will apply to the soil treatment alternative to the extent this component of the remedy involves handling, treatment or disposal of hazardous wastes.

All OSHA requirements for worker health and safety during hazardous waste operations and general industry standards are applicable during implementation of this remedy.
With respect to long-term groundwater monitoring, the RCRA

Groundwater Protection requirements (40 CFR §264, Subpart F) have been determined to be relevant and appropriate for this Site. The groundwater monitoring program implemented will be consistent with 40 CFR §264.100(d) to evaluate the effectiveness of the remedy.

C. The Selected Remedial Action is Cost-Effective

Of those alternatives that are protective and attain ARARs, EPA's selected remedy is a combination of the most cost-effective remedial alternative components that were evaluated. The remedy provides a degree of protectiveness proportionate to its costs. The soil treatment component was estimated to be significantly less costly than the four other protective alternatives, costing approximately 20% of the next cheapest alternative. The excavation of sediments for off-Site disposal is not the least costly alternative that was evaluated. However, because the selected remedy is more protective and effective in the long- and short-terms in providing a permanent solution on-site than the capping alternatives, and because it can be more readily implemented than the on-site treatment alternatives, it is the most cost-effective alternative. As for groundwater, the selected remedy is protective and is the least costly alternative evaluated. This was due to the choice of treatment and groundwater extraction technologies and to the more rapid rate of extraction which resulted in lower operation and maintenance costs.

A summary of the costs for each of the elements of the selected remedy are presented below. All costs are net present worth.

TOTAL COST OF SELECTED REMEDY

Contaminated Media	Capital	O&M	Total
Soil	$ 327,583	$ 202,145	$ 529,728
Sediments	782,189	-	782,189
Groundwater	2,284,747	3,790,005	6,074,752
			$7,387,769

D. The Selected Remedy Utilizes Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

The selected remedy utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. A brief description regarding how each component of the remedy meets this determination follows.

1. Soil. The soil remediation component of the

selected remedy utilizes an innovative treatment technology, in-situ vacuum extraction, to permanently reduce contaminants in soils to levels that are protective of human health and the environment. The selected remedy will provide a permanent solution for the VOC-contaminated soil by significantly reducing the toxicity, mobility, and volume of the contamination. The VOCs removed from the extracted soil vapor will be treated by being adsorbed onto activated carbon, which will be regenerated (and the VOCs destroyed) at an off-site resource recovery facility or on-site as part of the treatment process. While the alternatives involving incineration and mechanical aeration would also achieve the same degree of permanence using a treatment technology, as noted above, these alternatives would cost more without providing a more protective solution.

2. Sediments. The excavation and containment of contaminated sediments will provide a permanent solution at the Site to contamination in the wetlands. It provides for a permanent solution at this Site by removing and disposing of contaminated sediments in a RCRA landfill capable of insuring long-term security. While long-term uncertainties exist with the permanence of any landfilling alternative, the use of a licensed RCRA minimizes these uncertainties. The two capping alternatives, while considerably less expensive would leave the contamination in place, thus requiring perpetual maintenance to avoid failure of the containment system, and allowing the potential for future exposures to Site contaminants. Given the small volume of sediments, the limited availability of mobile incinerators and their extended start-up time, the on-site incineration alternative would be practicably implementable only if the selected soil remedial action had been on-site incineration.

3. Groundwater. The groundwater extraction and treatment component of the remedy will provide a permanent solution to contamination of the drinking water aquifer in the shortest period of time of any alternative evaluated. Of the seven groundwater remediation alternatives evaluated in the FS, three alternatives were found not to be protective nor able to meet ARARs. These included the No Action alternative, Well-Head Treatment, and Development of an Alternative Water Supply. Of the remaining alternatives, all of which were found to be permanent, protective and able to attain ARARs, the selected remedy attained the remedial objectives in the shortest period of time.

E. The Selected Remedy Satisfies the Preference for Treatment as a Principal Element

The principal element of the selected remedy is the treatment of groundwater and soils to permanently reduce contaminants to levels which are protective of human health and the environment. Groundwater extraction and treatment, used in conjunction with the in-situ vacuum extraction system for soils, addresses the primary threat at the Site, contamination of the groundwater. The selected remedy satisfies the statutory preference for treatment as a principal element by removing VOCs from the groundwater through the use of air stripping towers followed by carbon columns. Upon regeneration of the carbon, the contamination will have been effectively destroyed. Similarly, the VOCs removed from the soil vapor by the vacuum extraction process will effectively be destroyed during the regeneration of the carbon.

XII. STATE ROLE

The New Hampshire Department of Environmental Services has reviewed the various alternatives and has indicated its support for the selected remedy. The State has also reviewed the Remedial Investigation, Risk Assessment and the Feasibility Study to determine if the selected remedy is in compliance with applicable or relevant and appropriate State Environmental laws and regulations. The New Hampshire Department of Environmental Services concurs with the selected remedy for the South Municipal Water Supply Well Superfund Site. A copy of the declaration of concurrence is attached as Appendix A.

APPENDIX A

DECLARATION OF CONCURRENCE

STATE OF NEW HAMPSHIRE

State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES
OFFICE of the COMMISSIONER
6 Hazen Drive, P.O. Box 95, Concord, NH 03301
603-271-3503

ROBERT W. VARNEY
COMMISSIONER

GEORGE A. MOLLINEAUX, P.E.
ASSISTANT COMMISSIONER

September 20, 1989

Mr. Paul G. Keough
Acting Regional Administrator
U.S. Environmental Protection Agency
JFK Federal Building
Boston, MA 02203

Re: Record of Decision
South Municipal Water Supply Well Site
Peterborough, NH

Dear Mr. Keough:

The New Hampshire Department of Environmental Services has reviewed the above referenced Record of Decision (ROD) and concurs with the recommendations therein and that the recommended alternative is consistent with the rules and regulations of Applicable or Relevant and Appropriate State Requirements (ARARs). Furthermore, if the project utilizes the trust fund, the state will provide a 10 percent match and operational support for the project if state funds are available.

Sincerely,

Robert W. Varney
Commissioner

GAM/RWV/TCA/jd/08440
cc: Michael A. Sills, Ph.D., P.E., DES-WMD
Carl W. Baxter, P.E., DES-WMEB
Richard H. Pease, P.E., DES-WMEB
Geoffrey M. Huntington, Esq., NHAGO
Roger F. Duwart, USEPA - Region I

APPENDIX B

ARAR TABLES

Table 3-1: Chemical-specific ARARs

REQUIREMENT	APPLICABLE OR RELEVANT AND APPROPRIATE	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
STATE REQUIREMENT: GROUNDWATER			
1. RSA 149:8,III;N.H. Admin. Code Ws Ch.410 Protection of Ground Water	Applicable	These provisions regulate discharges to ground water and provide for ground water protection. No substance designated in Ws Ch. 410, or presenting a potential threat to health or the environment may be discharged to ground water so as to exceed water quality criteria.	The South Municipal Well Site must be remediated to prevent release of contaminants in violation of these provisions. See below for discussion of specific water quality criteria pursuant to Ws Ch. 410.
1.a. Ws 410.05(a) Discharges to Ground Water	Applicable	Ws 410.05(a) prohibits discharge of hazardous waste to ground water.	Remedial action must be taken to eliminate the uncontrolled discharge of hazardous waste constituents, volatile organic compounds (VOC's), and inorganic contaminants to the ground water aquifer below the site.
1.b. Ws 410.09 Ground Water Discharge Criteria, incorporating by reference Ws Part 302 (Maximum Contaminant Levels [MCL's] and Suggested No Adverse Response Levels [SNARLS])	Applicable	Ws 410.09 establishes ground water discharge criteria including MCLs and SNARLS, codified at Ws Part 302, Drinking Water Regulations. Standards applicable to the site include SNARLS for lifetime exposure to toxic contaminants, Ws 302.08(a); SNARLS for contaminants associated with cancer risk, Ws 302.08(b); and MCLs, Ws 302.02, Ws 302.04, and Ws 302.11.	Remedial actions must be taken at the South Municipal Well Site to eliminate the discharge of contaminants, including VOCs and inorganic contaminants, which result in ground water contamination above State MCL and SNARL levels.
1.c. Ws 410.10 Additional Ground Water Criteria	Applicable	This requirement provides that ground water shall not be altered so as to render it unsuitable for drinking water. Drinking water standards include both state and federal minimum requirements.	Remedial action must be taken at the Site to eliminate discharge of contaminants which render the ground water unsuitable for drinking water.

Table 3-1: Chemical-specific ARARs

REQUIREMENT	APPLICABLE OR RELEVANT AND APPROPRIATE	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
STATE REQUIREMENTS: GROUND WATER (cont'd)			
I.d. Ws 410.05(e) Ground Water Quality Criteria; Health-based Ground Water Protection Standards	Applicable	Under this requirement, ground water shall not contain any substance which the Water Supply and Pollution Control Division (WSPCD) determines may be harmful to human health or the environment.	Remedial actions must be taken to eliminate discharges of substances which may be harmful to human health or the environment. This may include substances exceeding the cancer risk health advisory limits established by the NH Division of Public Health Services.
I.e. Ws 410.05(g) Ground Water Quality Criteria; Nondegradation of Surface Water	Applicable	Ws 410.05(g) provides that ground water quality shall not be degraded such that it results in a violation of surface water standards in any surface water body in or adjacent to the site.	Remedial action must be taken to eliminate any discharge to ground water resulting in violation of surface water quality at adjacent surface waters, including the unnamed onsite brooks, the Contoocook River, Noone Pond, and the wetlands.
NHDPHS Drinking Water Criteria	To Be Considered	These criteria are used by the NHDPHS as a basis for consumption advisories for water supplies. 1,1-DCA has a criteria of 810 ppb.	The NHDPHS criteria should be considered in establishing clean-up goals for contaminated groundwater.
STATE REQUIREMENTS: SURFACE WATER			
RSA 149:8,I Enforcement of Surface Water Classifications	Applicable	This requirement prohibits the disposal of wastes in such a manner as will lower the quality of any surface water below the minimum requirements of the surface water classification. Standards applicable to the South Municipal Well Site are standards for the preservation of Class B waters.	Discharge of treated water to surface waters as part of any remedial alternative must comply with this requirement.
Ws Ch. 400, Part 437 Water Quality Standards Fish Life	Applicable	This requirement provides that state surface waters shall be free from chemicals or conditions harmful to fish life.	Remedial actions which include discharge of treated water to surface water must comply with this requirement.

Table 3-1: Chemical-specific ARARs

REQUIREMENT	APPLICABLE OR RELEVANT AND APPROPRIATE	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
STATE REQUIREMENTS: SURFACE WATER (cont'd)			
Ws Ch. 400, Part 439 Antidegradation Policy	Applicable	Ws Ch.400, Part 439 establishes the state policy against degradation of existing water quality, and requires protection of in-stream beneficial uses.	Remedial alternatives which include discharge of treated water to surface waters must comply with this policy.
STATE REQUIREMENTS: AIR EMISSIONS			
RSA Ch. 125-C, Air Pollution Control; NH Admin. Code Air Ch. 100 Parts 604-606; 1002	Applicable	This requirement establishes standards for the release of air emissions, including VOCs and hazardous air pollutants.	Actions may be required to prevent unpermitted air emissions from the site, particularly during implementation of remedial alternatives involving excavation.
FEDERAL REQUIREMENTS: GROUND WATER			
40 CFR 141.11-141.16 Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs)	Applicable	SDWA MCLs are enforceable standards which have been developed for 30 toxic compounds for public drinking water systems. MCLs reflect both health factors and technical and economic feasibility of removing the contaminant from the water supply. South Municipal Wells Site contaminants for which MCLs have been promulgated include 1,1-DCE; 1,1,1-TCA; and TCE.	Remedial actions must be implemented at the Site to reduce contaminant concentrations in ground water to MCLs.
40 CFR 264.94 Resource Conservation and Recovery Act (RCRA) Maximum Concentration Limits		RCRA Maximum Concentration Limits are standards for 14 toxic compounds, primarily toxic metals and pesticides, adopted as part of RCRA ground water protection standards.	Contaminants found in NHBB ground water are not regulated by RCRA MCLs.

Table 3-1: Chemical-specific ARARs

REQUIREMENT	APPLICABLE OR RELEVANT AND APPROPRIATE	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
FEDERAL REQUIREMENTS: GROUND WATER (cont'd)			
40 CFR 141.50-141.51 SDWA MCL Goals	To Be Considered	MCL Goals are nonenforceable health goals for public water systems. The EPA has promulgated MCL Goals for 9 contaminants, including 1,1-DCE; 1,1,1-TCA; and TCE which are found at the South Municipal Well Site.	If SDWA MCLs do not provide sufficient protection to human and environmental receptors, MCL goals should be considered in establishing health-based standards.
FEDERAL REQUIREMENTS: SURFACE WATER			
PL 92-500 Sections 301, 302, 303 and 304 Clean Water Act (CWA) Water Quality Criteria for Protection of Human Health	To Be Considered	Water Quality Criteria (WQC) are non-enforceable guidance developed under the CWA, used by the state, in conjunction with a designated use for a stream segment, to establish water quality standards. WQC levels for protection of human health from consuming aquatic organisms (primarily fish) have been developed for PERC, TCE, toluene and 1,1,1-TCA.	Ground water remedial alternatives which include discharge of treated water into surface waters must take this guidance into consideration.
PL 92-500 Sections 301, 302, 303 and 304 Clean Water Act (CWA) Ambient Water Quality Criteria (AWQC) for Protection of Aquatic Life	To Be Considered	AWQC for protection of aquatic organisms have been set for 1,1-DCE, PERC, TCE and toluene.	Groundwater remedial alternatives which include discharge of treated water into surface waters must take AWQC into consideration.
16 U.S.C. Subsection 661 et seq.; Fish and Wildlife Coordination Act	Applicable	This act requires action to protect fish and wildlife from action modifying streams or areas affecting streams.	The selected remedy must be implemented in accordance with any actions required by the U.S. Department of the Interior's Fish and Wildlife Service and the State of New Hampshire, which oversee administration of wildlife resources.

Table 3-1: Chemical-specific ARARs

REQUIREMENT	APPLICABLE OR RELEVANT AND APPROPRIATE	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
FEDERAL REQUIREMENTS: AIR EMISSIONS			
42 USC 7401, Clean Air Act; 40 CFR pt.50, National Ambient Air Quality Standards (NAAQS)		NAAQS are enforced through state regulations. See NH RSA Ch.125-C above.	

A blank in the "Applicable or Relevant and Appropriate" column indicates that the requirement is neither applicable nor relevant and appropriate at the site.

Table 3-2: Location-specific ARARs

REQUIREMENT	APPLICABLE OR RELEVANT AND APPROPRIATE	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
STATE REQUIREMENTS: WETLANDS			
RSA 149:8-a, Dredging and Control of Run-Off; Ws Ch. 400 Part 415, Dredging Rules	Applicable	These requirements establish criteria for conducting any activity in or near state surface waters which significantly alters terrain or may otherwise adversely affect water quality, impede natural runoff or create unnatural runoff. This includes excavation, dredging, and grading of topsoil in or near wetlands areas.	Any remedial alternatives involving dredging and/or excavation in or near the wetlands on the NHBB site must comply with these requirements.
RSA Ch. 483-A, Fill and Dredge in Wetlands; and Ws Ch. 300, Criteria and Conditions	Applicable	These requirements regulate filling and other activities in or adjacent to wetlands. They establish criteria for the protection of wetlands from adverse impacts on fish, wildlife, commerce and public recreation.	Any remedial activities in or adjacent to wetlands on the NHBB site must comply with these requirements.
FEDERAL REQUIREMENTS: WETLANDS			
Clean Water Act (CWA) Section 404; 40 CFR part 230; 33 CFR parts 320-330	Applicable	These requirements prohibit the discharge of dredged or fill material into wetlands without a permit.	Wetlands are located in and adjacent to the South Municipal Well Site. Remedial activities on the site must comply with these criteria for the discharge of materials into the wetlands.
EO 11990 Wetlands Executive Order	Applicable	Under this regulation, federal agencies are required to preserve and enhance natural and beneficial values of wetlands, and to minimize the destruction and loss or degradation of wetlands.	The selected remedial action will be undertaken in such a manner to avoid or minimize the destruction, loss and degradation of Site wetlands and to preserve and enhance the natural and beneficial use of wetlands.

Table 3-2: Location-specific ARARs

REQUIREMENT	APPLICABLE OR RELEVANT AND APPROPRIATE	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
FEDERAL REQUIREMENTS: WETLANDS (cont'd)			
40 CFR part 6, Appendix A	To Be Considered	40 CFR part 6, Appendix A contains the EPA policy for carrying out the provisions of EO 11990. The policy involves the construction of facilities and the management of property in wetlands to avoid adverse effects, minimize potential harm, and preserve and enhance wetlands to the extent possible.	Remedial activities on the site must comply with these requirements to preserve and protect the onsite and near-site wetlands to the extent possible.
FEDERAL REQUIREMENTS: FLOODPLAINS			
40 CFR 264.18(b) Resource Conservation and Recovery Act (RCRA) Location Standards	Applicable	The RCRA location standards include the requirements for constructing a RCRA facility on a 100-year floodplain.	The South Municipal Well Site is located on a 100-year floodplain. Any facility constructed on the site must meet these RCRA location requirements.
EO 11988 Floodplains Executive Order	Applicable	Under this requirement, federal agencies are required to reduce the risk of flood loss, to minimize impact of floods, and to restore and preserve the natural and beneficial value of floodplains.	Remedial activities will be undertaken in such a manner to reduce the risk of flood loss, minimize the impact of floods, and to restore and preserve the natural and beneficial value of floodplains.
40 CFR 6, Appendix A	To Be Considered	40 CFR 6, Appendix A contains the EPA policy for carrying out the provisions of EO 11988.	Remedial alternatives must comply with this EPA policy to the extent possible.

Table 5-1: Action-Specific ARARs

Requirement	No Action GW#1, GW#7* SL#1, SD#1	Ground Water Extraction, Treatment and Disposal GW#3, #4, #6, #8, #9	Excavation/Dredging & Off-Site Disposal SL#3, SD#5	Excavation/Dredging & On-Site Treatment SL#5, #6 SD#7, #8	In-Situ Vacuum Extraction SL#7	In-Situ Soil Washing SL#8	Capping SD#3, #4
STATE REQUIREMENTS: HAZARDOUS WASTE							
1. RSA Ch. 147-A, New Hampshire Hazardous Waste Management Act; N.H. Admin. Code He-P Ch. 1905.	A	A	A	A	A	A	A
a. Hazardous Waste Facility Security Requirements, He-P 1905.08(d), incorporating by reference 40 CFR 264.14.	A	A	A	A	A	A	A
b. General Inspection Requirements, He-P 1905.08(d)(4)(d) incorporating by reference 40 CFR 264.15.	A	A	A	A	A	A	A
c. Personnel Training, He-P 1905.08(d)(4)(e) incorporating by reference 40 CFR 264.16.	A	A	A	A	A	A	A

*GW#7, Development of an alternate water supply, will not in itself take any direct action to treat current contamination. It is therefore included in the No Action category here.

Table 5-1: Action-Specific ARARs

Requirement	No Action GW#1, GW#7* SL#1, SD#1	Ground Water Extraction, Treatment and Disposal GW#3, #4, #6, #8, #9	Excavation/Dredging & Off-Site Disposal SL#3, SD#5	Excavation/Dredging & On-Site Treatment SL#5, #6 SD#7, #8	In-Situ Vacuum Extraction SL#7	In-Situ Soil Washing SL#8	Capping SD#3, #4
STATE REQUIREMENTS: HAZARDOUS WASTE (cont'd)							
d. Location Standards, He-P 1905.08(d)(4)(g) incorporating by reference 40 CFR 264.18 and He-P 1905.08(2)j.	A	A	A	A	A	A	A
e. Preparedness and Prevention Requirements, He-P 1905.08(d)(4)(h) incorporating by reference 40 CFR 264, Subpart C.	A	A	A	A	A	A	A
f. Contingency Plan, He-P 1905.08(d)(4)(i) incorporating by reference 40 CFR 264, Subpart D.	A	A	A	A	A	A	A
g. Groundwater Protection, He-P 1905.08(d)(4)(j) incorporating by reference 40 CFR 264, Subpart F.	A	A	A	A	A	A	A
h. Closure and Post-Closure, He-P 1905 08(d)(4)(k) incorporating by reference 40 CFR 264, Subpart G.	A	A	A	A	A	A	A

Table 5-1: Action-specific ARARs

Requirement	No Action GW#1, GW#7* SL#1, SD#1	Ground Water Extraction, Treatment and Disposal GW#3, #4, #6, #8, #9	Excavation/Dredging & Off-Site Disposal SL#3, SD#5	Excavation/Dredging & On-Site Treatment SL#5, #6 SD#7, #8	In-Situ Vacuum Extraction SL#7	In-Situ Soil Washing SL#8	Capping SD#3, #4
STATE REQUIREMENT: HAZARDOUS WASTE (Cont'd)							
i. Transfer of Facility, He-P 1905.08(d)(5).	A	A	A	A	A	A	A
j. Monitoring, He-P 1905.08(d)(6).	A	A	A	A	A	A	A
k. Public Notification Plan, He-P 1905.08(d)(9).	R & A	R & A	R & A	R & A	R & A	R & A	R & A
l. General Environmental Standards, He-P 1905.08 (d)(1).	A	A	A	A	A	A	A
m. General Design Standards, He-P 1905.08(d)(2).	A	A	A	A	A	A	A
n. Technical Standards for Landfills, He-P 1905.08(f)(1)(f) incorporating by reference 40 CFR 264, subpart N, and He-P 1905.08(f)(2)(d).	A		A	A	R & A	R & A	A
o. Additional Technical Standards for Treatment He P 1905.08(f)(2)(a).		A		A	A	A	A

Table 5-1: Action-specific ARARs

Requirement	No Action GW#1, GW#7* SL#1, SD#1	Ground Water Extraction, Treatment and Disposal GW#3, #4, #6, #8, #9	Excavation/Dredging & Off-Site Disposal SL#3, SD#5	Excavation/Dredging & On-Site Treatment SL#5, #6 SD#7, #8	In-Situ Vacuum Extraction SL#7	In-Situ Soil Washing SL#8	Capping SD#3, #4
STATE REQUIREMENT: HAZARDOUS WASTE (cont'd)							
p. Storage Standards He-P 1905.08(f)(2)(c)		A	A	A	A	A	
q. Technical Standards for Waste Piles, He-P 1905.08(f)(1)(d) incorporating by reference 40 CFR 264, Subpart L.			A	A			
r. Technical Standards for Use and Management of Containers, He-P 1905.08(f)(1)(a) incorporating by reference 40 CFR 264, Subpart I.		A	A	A	A	A	
s. Technical Standards for Tanks, He-P 1905.08(f)(1)(b) incorporating by reference 40 CFR 264, Subpart J.		A		A	A	A	
t. Standards for Generators, He-P 1905.06		A	A	A	A	A	
u. Manifesting Requirements He-P 1905.04.		A	A	A	A	A	

Table 5-1: Action-Specific ARARs

Requirement	No Action GW#1, GW#7* SL#1, SD#1	Ground Water Extraction, Treatment and Disposal GW#3, #4, #6, #8, #9	Excavation/Dredging & Off-Site Disposal SL#3, SD#5	Excavation/Dredging & On-Site - Treatment SL#5, #6 SD#7, #8	In-Situ Vacuum Extraction SL#7	In-Situ Soil Washing SL#8	Capping SD#3, #4
STATE REQUIREMENT: HAZARDOUS WASTE (cont'd)							
v. Packaging and Labelling Requirements, He-P 1905.05, incorporating by reference NH Admin. Code Saf-C-600 and 40 CFR 172, 173, 178, and 179.		A	A	A	A	A	
w. Technical Standards for Incinerators, He-P 1905.08(f)(1)g, incorporating by reference 40 CFR 264, Subpart O				A			
STATE REQUIREMENTS: AIR EMISSION LIMITS							
N.H. Admin Code Air Parts 604-606.	A	A	A	A	A	A	A
Fugitive Dust Emission Control, N.H. Admin. Code Air Part 1002.		A	A	A	A	A	A
STATE REQUIREMENTS: GROUND WATER							
RSA 149:8, III; N.H. Admin. Code Ws Ch.410.		A				A	

Table 5-1: Action-Specific ARARs

Requirement	No Action GW#1, GW#7* SL#1, SD#1	Ground Water Extraction, Treatment and Disposal GW#3, #4, #6, #8, #9	Excavation/Dredging & Off-Site Disposal SL#3, SD#5	Excavation/Dredging & On-Site Treatment SL#5, #6 SD#7, #8	In-Situ Vacuum Extraction SL#7	In-Situ Soil Washing SL#8	Capping SD#3, #4
STATE REQUIREMENTS: SURFACE WATER							
RSA Ch. 149; N.H. Admin. Code Ws Ch. 430.		A					
RSA 149:4-a; N.H. Admin. Code Ws Ch. 900, Part 904, Pretreatment Standards for Publicly Owned Treatment Works (POTW).		A					
Ws Ch. 400, Part 437 Water Quality Standards-Fish Life.		A					
Ws Ch. 400, Part 439 Antidegradation Policy.		A					
FEDERAL REQUIREMENTS: HAZARDOUS WASTE							
** 1. Hazardous Waste Regulations, RCRA Subtitle C, 40 CFR Part 264.							

** All provisions of 40 CFR 264 are addressed by provisions of the New Hampshire Waste Management Act, which become ARAR for the South Municipal Well Site.

Table 5-1: Action-Specific ARARs

Requirement	No Action GW#1, GW#7* SL#1, SD#1	Ground Water Extraction, Treatment and Disposal GW#3, #4, #6, #8, #9	Excavation/Dredging & Off-Site Disposal SL#3, SD#5	Excavation/Dredging & On-Site Treatment SL#5, #6 SD#7, #8	In-Situ Vacuum Extraction SL#7	In-Situ Soil Washing SL#8	Capping SD#3, #4
FEDERAL REQUIREMENT: HAZARDOUS WASTE (cont'd)							
OSHA Requirements 29 CFR 1910, 1926 and 1904.	A	A	A	A	A	A	A
DOT Rules for Hazardous Materials Transport 49 CFR 107, 171.1-171.500.		A	A	A	A	A	
TSCA regulations governing DRE requirements for PCB wastes, 40 CFR 761.70				A			
Land Disposal Regulations 40 CFR 268		A	A	A	A	A	
FEDERAL REQUIREMENTS: SURFACE WATER							
PL 92-500 Sections 301, 302, 303, and 304 Clean Water Act (CWA) Water Quality Criteria		A					
40 CFR 430 Federal Pretreatment Requirements for Discharge to Publicly Owned Treatment Works.		A					

Table 5-1: Action-Specific ARARs

Requirement	No Action GW#1, GW#7* SL#1, SD#1	Ground Water Extraction, Treatment and Disposal GW#3, #4, #6, #8, #9	Excavation/Dredging & Off-Site Disposal SL#3, SD#5	Excavation/Dredging & On-Site Treatment SL#5, #6 SD#7, #8	In-Situ Vacuum Extraction SL#7	In-Situ Soil Washing SL#8	Capping SD#3, #4
FEDERAL REQUIREMENTS: SURFACE WATER (cont.)							
40 CFR 125 Regulations on Criteria and Standards for the National Pollutant Discharge Elimination System (NPDES)		A					
FEDERAL REQUIREMENTS: AIR EMISSIONS LIMITS							
Clean Air Act 42 USC 6401; National Ambient Air Quality Standards (NAAQS) 40 CFR 50.	A	A	A	A	A	A	A

Table 5-2: Action Specific ARAR Synopses

REQUIREMENT	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
STATE REQUIREMENT: HAZARDOUS WASTE		
1. RSA Ch. 147-A, New Hampshire Hazardous Waste Management Act; N.H. Admin. Code He-P Ch. 1905.	The New Hampshire Hazardous Waste Management Act establishes standards applicable to the treatment, storage, transport and disposal of hazardous waste and the closure of hazardous waste facilities.	Hazardous waste at the South Municipal Well Site must be managed, stored, transported and disposed of in accordance with the NH Hazardous Waste Management Act. Specific requirements of the Act are discussed below.
a. Hazardous Waste Facility Security Requirements, He-P 1905.08(d), incorporating by reference 40 CFR 264.14.	Federal RCRA requirements for the adoption of security measures are incorporated by this provision. These measures are intended to protect the public from exposure to hazardous wastes.	The facility would be required to be fenced, posted, and operated in compliance with this provision.
b. General Inspection Requirements, He-P 1905.08(d)(4)(d) incorporating by reference 40 CFR 264.15.	This provision incorporates federal RCRA requirements for the regular inspection of hazardous waste facilities.	General Inspection Requirements require hazardous waste facilities to implement regular inspections, maintain written records, and remedy operational problems.
c. Personnel Training He-P 1905.08(d)(4)(e), incorporating by reference 40 CFR 264.16.	Hazardous waste facility personnel must be trained to ensure compliance with applicable standards and effective emergency response to comply with federal RCRA requirements which are incorporated under this provision.	The facility would be required to implement a personnel training program and to maintain written records in accordance with this provision.
d. Location Standards, He-P 1905.08(d)(4)(g), incorporating by reference 40 CFR 264.18 and He-P 1905.08(2)(j).	Siting of hazardous waste facilities near geological fault areas and flood plains is restricted under the Location Standards. He-P 1905.08(2)(j) sets forth the State procedure for identifying the boundaries of flood plains.	The location and design of any hazardous waste facility at the South Municipal Well Site must meet the requirements of the Location Standards. The Site is located on a 100-year floodplain.

Table 5-2: Action Specific ARAR Synopses

REQUIREMENT	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
STATE REQUIREMENT: HAZARDOUS WASTE (cont'd)		
e. Preparedness and Prevention Requirements, He-P 1905.08(d)(4)(h) incorporating by reference 40 CFR 264, Subpart C.	This provision incorporates federal RCRA requirements for prevention and response to releases of hazardous waste.	Provisions must be made during facility construction and operation for internal communication, equipment, emergency response capability, and arrangements with local emergency response authorities under this requirement.
f. Contingency Plan, He-P 1905.08(d)(4)(i), incorporating by reference 40 CFR 264, Subpart D.	Federal RCRA requirements for emergency procedures and contingency plans are incorporated under this provision.	The facility would be required to develop and maintain written contingency plans and emergency procedures in accordance with this provision.
g. Groundwater Protection, He-P 1905.08(d)(4)(j), incorporating by reference 40 CFR 264, Subpart F.	This provision establishes standards (additional to standards in NH Admin. Code Ws Ch. 410) for groundwater monitoring and appropriate remediation at hazardous waste facilities. The provision prohibits the discharge of constituents into ground water above federal RCRA limits for such contaminants at the compliance point, which is defined as the boundary of each waste management unit under 40 CFR 264.95.	The facility would be required to implement a ground water monitoring and protection program in accordance with this provision.
h. Closure and Post-Closure, He-P 1905.08(d)(4)(k), incorporating by reference 40 CFR 264, Subpart G.	Design and performance standards for hazardous waste facility remediation and closure are set forth under this provision which incorporates federal RCRA requirements.	A written plan for site closure and post-closure care must be developed and implemented in accordance with this provision.
i. Transfer of Facility, He-P 1905.08(d)(5).	This provision establishes requirements for notifying the Division of Waste Management (Division) and future owners or operators when the facility is transferred.	The requirements of this provision must be met prior to any transfer of facility ownership or operation.

Table 5-2: Action Specific ARAR Synopses

REQUIREMENT	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
STATE REQUIREMENT: HAZARDOUS WASTE (cont'd)		
j. Monitoring He-P 1905.08(d)(6).	Ground water monitoring requirements and authorization of the Bureau to require other appropriate environmental monitoring are established in this provision.	Ground water monitoring would be required for operation of any hazardous waste facility. Additional monitoring, such as air emission monitoring may be necessary to detect releases of fugitive dust or VOCs during remedial activities.
k. Public Notification Plan, He-P 1905.08(d)(9).	The Bureau is authorized to require development of a program to inform the public of the status of facility activities under this provision.	A public notification plan is appropriate to ensure that the public will receive on-going information as to the implementation of the selected remedy and the status of site closure. A program for regular notification of the public as to the status of site remediation should be developed.
l. General Environmental Standards, He-P 1905.08(d)(1).	This provision requires facilities to comply with specified state and federal environmental standards and to provide protection to workers in accordance with state and federal occupational health and safety requirements. Applicable occupational standards include 29 CFR Ch. 1910 (industry standards); 29 CFR Ch. 1926 (safety and health standards); NH RSA Ch. 277-A (Worker's Right-to-Know Act); NH Admin. Rules He-P Ch. 1800, Part 1803 (Toxic Substances in the Workplace).	Facility operation must comply with environmental and occupational safety requirements.
m. General Design Standards, He-P 1905.08(d)(2).	General facility design standards to prevent release of hazardous constituents are established under this provision.	The design standards from this provision must be incorporated into plans for hazardous waste facilities.
n. Technical Standards for Landfills, He-P 1905.08 (d)(1)(f), incorporating by reference 40 CFR 264, Subpart N, and He-P 1905.08 (f)(2)(d).	NH Technical Standards for Landfills incorporates federal RCRA requirements for landfills, supplemented by additional state standards set forth in He-P 1905.08 (f)(2)(d). He-P 1905.08(f)(2)(d) requires a demonstration that landfill disposal is the only practical way to dispose of wastes, and a description of how the facility will meet specified design requirements.	Several South Municipal Well Site alternatives involve on-site land disposal of hazardous wastes. Disposal by landfill in the state of New Hampshire must be deemed to be the only practical way to dispose of hazardous wastes, after assessing all available waste management alternatives and must meet all other standards set forth in He-P 1905.08 (d)(1)(f).

Table 5-2: Action Specific ARAR Synopses

REQUIREMENT	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
STATE REQUIREMENT: HAZARDOUS WASTE (cont'd)		
o. Additional Technical Standards for Treatment He-P 1905.08(f)(2)(a).	This provision requires a demonstration that proposed treatment methods will meet specified design and construction requirements.	A treatment facility must demonstrate that the technology will be effective and will meet the design requirements of this provision.
p. Storage Standards, He-P 1905.08(f)(2)(c)	Design and construction requirements for facilities which store hazardous wastes are specified in this provision.	The storage of hazardous wastes, groundwater treatment residuals, and contaminated soils must minimize any danger to human health or the environment, must include mechanisms to prevent and detect releases to the environment, and must otherwise comply with design standards set forth in this provision.
q. Technical Standards for Waste Piles, He-P 1905.08 (f)(1)(d), incorporating by reference 40 CFR 264, Subpart L.	This provision incorporates federal RCRA requirements for waste piles.	Waste piles must be operated in compliance with 40 CFR 264 Subpart L.
r. Technical Standards for Use and Management of Containers, He-P 1905.08(f)(1)(a), incorporating by reference 40 CFR 264, Subpart I.	This provision incorporates federal RCRA requirements for facilities that store containers of hazardous waste.	Design and management of hazardous waste containers must comply with this provision. These container standards apply to the shipment of treatment residuals and contaminated materials for off-site treatment or disposal.
s. Technical Standards for Tanks, He-P 1905.08(f)(1)(b) incorporating by reference 40 CFR 264, subpart J.	This provision incorporates federal RCRA requirements for facilities using tanks to treat or store hazardous wastes.	Design and maintenance of tanks must comply with this provision, and regular tank inspection and maintenance must be conducted by the facility.
t. Standards for Generators, He-P 1905.06	Requirements applicable to generators, including persons transporting hazardous wastes or treatment residuals are established by this provision.	Any facility generating wastes for transport offsite must comply with these requirements.

Table 5-2: Action Specific ARAR Synopses

REQUIREMENT	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
STATE REQUIREMENT: HAZARDOUS WASTE (cont'd)		
u. Manifesting Requirements, He-P 1905.04	The transport of any hazardous wastes off-site must comply with the manifest and record-keeping requirements set forth in this provision.	Any hazardous wastes, including treatment residuals, shipped from the site for further treatment or disposal must be properly manifested and handled.
v. Packaging and Labelling Requirements, He-P 1905.05, incorporating by reference NH Admin. Code Saf-C-600 and 49 CFR 172, 173, 178, and 179.	Hazardous wastes transported off-site must be packaged and labelled in accordance with New Hampshire Department of Safety rules and federal transportation requirements.	Treatment residuals and hazardous wastes must be packaged and handled in compliance with these requirements. Containers of hazardous waste must be clearly marked, and transport vehicles placarded prior to transport off-site.
w. Technical Standards for Incinerators, He-P 1905.08(f)(1)g, incorporating by reference 40 CFR 264, Subpart O	This provision incorporates federal RCRA requirements for incineration of hazardous wastes.	Any incineration of hazardous wastes must comply with the requirements set forth in these regulations.
STATE REQUIREMENTS: AIR EMISSION LIMITS		
N.H. Admin. Code Air Parts 604-606.	Limits for the emission of air pollutants are established under this provision.	All remedial alternatives must comply with these air emission limits, including limits on the release of volatile contaminants into the environment.
Fugitive Dust Emission Control, N.H. Admin. Code Air Part 1002.	Activities such as construction and excavation must include precautions to prevent, abate and control fugitive dust emissions.	All remedial actions involving construction, excavation or other activities which may emit dust must include precautions to control the fugitive dust emissions.

Table 5-2: Action Specific ARAR Synopses

REQUIREMENT	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
STATE REQUIREMENTS: GROUND WATER		
RSA 149:8, III; N.H. Admin. Code Ws Ch. 410. Protection of Ground Water	These provisions establish criteria for ground water protection. See further discussion of this provision in Table 3-1.	All remedial alternative which involve discharges to ground water must comply with these standards.
STATE REQUIREMENTS: SURFACE WATER		
RSA Ch. 149, N.H. Admin. Code Ch. Ws 430	These provisions establish criteria for surface water protection.	Contaminants, treated effluent or treated ground water which are discharged to surface water must comply with these standards.
RSA 149:4-a; N.H. Admin. Code Ws Ch. 900, part 904, Pretreatment Standards for Publicly Owned Treatment Works (POTW).	These provisions establish standards for discharges to publicly owned sewage treatment facilities.	Treated ground water or other effluent discharged to any POTW must comply with these standards.
Ws Ch. 400, Part 437 Water Quality Standards-Fish Life.	This requirements provides that state surface waters shall be free from chemicals or conditions harmful to fish life.	Remedial actions which include discharge of treated water to surface water must comply with this requirement.
Ws Ch. 400, Part 439 Antidegradation Policy.	Ws Ch. 400, Part 439 establishes the state policy against degradation of existing water quality, and requires protection of in-stream beneficial uses.	Remedial alternatives which include discharge of treated water to surface waters must comply with this policy.

Table 5-2: Action Specific ARAR Synopses

REQUIREMENT	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
FEDERAL REQUIREMENTS: HAZARDOUS WASTE		
1. Hazardous Waste Regulations, RCRA Subtitle C, 40 CFR Part 264.**	RCRA Subtitle C establishes standards applicable to the treatment, storage, transport and disposal of hazardous waste and the closure of hazardous waste facilities.	Hazardous wastes treated, stored, transported from or disposed of at the South Municipal Well Site must comply with RCRA Subtitle C regulations.
OSHA Requirements 29 CFR Parts 1910, 1926 and 1904.	These requirements provide regulations for worker health and safety during remedial activities, non-workplace public health, and reporting and record keeping.	All OSHA requirements must be met for workers engaged in on-site remedial activities, and for non-workplace public health.
DOT Rules for Hazardous Materials Transport, 49 CFR 107, 171.1-171.500.	These requirements regulate transport of hazardous materials.	Remedial alternatives which involve transport of hazardous waste or treatment residuals off-site must comply with these regulations.
TSCA regulations governing DRE requirements for PCB wastes, 40 CFR 761.70	These regulations govern destruction and removal efficiencies (DRE) for PCB contaminated wastes, and PCB concentrations in treated materials.	Incineration of PCB contaminated wastes must achieve greater than 99.9999% destruction and removal efficiency (DRE); and treated materials must contain <200 ppb PCB's.
Land Disposal Regulations 40 CFR 268	These regulation govern and restrict the land disposal of specific hazardous wastes (groundwater and soils contaminated with spent halogenated solvents in this case) and provide concentrations of waste constituents which will allow for land disposal.	Discharge of treated groundwater and disposal of collected leachate, disposal of contaminated soils which have been excavated for treatment, and disposal of residuals or leachate collected from in-situ soil remediation must comply with these regulations.

**All provisions of 40 CFR 264 are addressed by provisions of the New Hampshire Waste Management Act, which become ARAR for the South Municipal Well Site.

Table 5-2: Action Specific ARAR Synopses

REQUIREMENT	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
FEDERAL REQUIREMENTS: SURFACE WATER		
PL 92-500 Sections 301, 302, 303, and 304 Clean Water Act (CWA) Water Quality Criteria.	Water Quality Criteria are nonenforceable guidance developed under the CWA to establish water quality standards.	Remedial alternatives which involve discharge of treated ground water to surface waters must comply with these criteria.
40 CFR 403, Federal Pretreatment Requirements for Discharge to Publicly Owned Treatment Works (POTW)	These requirements developed under the Clean Water Act establish standards for water which is discharged to POTW.	Remedial alternatives including discharge of treated water to POTW must comply with these pretreatment requirements.
40 CFR 125 Regulations on Criteria and Standards for the National Pollutant Discharge Elimination System (NPDES)	These requirements developed under the Clean Water Act establish criteria and standards for water which is discharged to surface water.	All remedial alternatives involving discharge of treated water to surface water must comply with these requirements.
FEDERAL REQUIREMENTS: AIR EMISSIONS LIMITS		
Clean Air Act 42 USC 6401; National Ambient Air Quality Standards (NAAQS) 40 CFR 50.	These requirements establish standards for emission of various contaminants into the atmosphere.	All remedial alternatives must comply with these standards. Vapor collection technologies may be necessary for some alternatives to meet emissions standards. Dust control may be necessary during excavation and/or well installation to meet standards.

APPENDIX C

RESPONSIVENESS SUMMARY

PREFACE

The U.S. Environmental Protection Agency (EPA) held a public comment period, from July 21, 1989 to August 19, 1989, to provide an opportunity for interested parties to comment on the draft Feasibility Study (FS) and the July 1989 Proposed Plan prepared for the South Municipal Water Supply Well Superfund Site (the Site) in Peterborough, New Hampshire. The draft FS examines and evaluates various options, called remedial alternatives, for addressing contamination of groundwater, soil and sediment at the Site. EPA identified its preferred alternative for the cleanup of the Site in the Proposed Plan before the start of the public comment period.

The purpose of this responsiveness summary is to identify major comments raised during the public comment period and to provide EPA response to the comments. EPA has considered all of the comments summarized in this document before selecting a final remedial alternative for the contamination at the Site in Peterborough, New Hampshire.

This responsiveness summary is divided into the following sections:

I. Overview of Remedial Alternatives Considered in the Draft Feasibility Study, Including the Preferred Alternative - This section briefly outlines the remedial alternatives evaluated in the draft FS and the Proposed Plan, including EPA's preferred alternative.

II. Background on Community Involvement and Concerns - This section provides a brief history of community interest and concerns regarding the Site.

III. Summary of Comments Received During the Public Comment Period and EPA Responses - This section summarizes and provides EPA responses to the oral and written comments received from the public during the public comment period. In Part I, the comments received from citizens and EPA's responses are organized by subject. In Part II, the comments received from the PRP, including the PRP's preferred alternative, are presented followed by EPA's response.

Exhibit A - This exhibit is a list of the community relations activities that the EPA has conducted at the Site.

Exhibit B - This exhibit is a copy of the transcript from the informal public hearing that was held on August 3, 1989.

I. OVERVIEW OF REMEDIAL ALTERNATIVES CONSIDERED IN THE DRAFT FEASIBILITY STUDY, INCLUDING THE PREFERRED ALTERNATIVE

Using the information gathered during the Remedial Investigation (RI) and the Endangerment Assessment (EA), EPA identified several objectives for the cleanup of the Site. These response objectives are:

- Eliminate or minimize, to the maximum extent practicable, the threat posed to the public health, welfare, and environment by the current extent of contamination for groundwater, soils, and sediments;
- Eliminate or minimize the migration of contaminants from the soils into the groundwater; and
- Meet federal and state Applicable or Relevant and Appropriate Requirements (ARARs).

New Hampshire Ball Bearings, Inc. (NHBB), with EPA oversight, screened and evaluated potential cleanup alternatives for the Site. This evaluation, contained in the FS, specifically describes alternatives for addressing contamination of groundwater and contaminated soil and sediments, as well as the criteria used to narrow the list to six alternatives for groundwater contamination and eleven alternatives for soil and sediment contamination. Each of these alternatives is briefly described below.

SL #1
No Action

Analysis of the No-Action alternative is required by federal regulations and is included for comparison with other remedial alternatives. Under this alternative, no action would be taken to remediate contaminated soils at the South Municipal Well site.

SL #3
Disposal of Contaminated soils at an Off-Site Landfill

For this alternative, 7500 cubic yards of contaminated soils would be disposed in an off-site landfill that complies with the requirements of the Resource Conservation and Recovery Act (RCRA).

SL #5
On-Site Incineration

On-site incineration of contaminated NHBB soils would involve excavating approximately 7500 cubic yards of soil, as in SL #3. The soils would be treated on-site with a mobile incinerator, and the treated material would be replaced in excavated areas and covered with clean fill.

SL #6
On-Site Mechanical Aeration

On-site mechanical aeration involves excavating approximately 7500 cubic yards of contaminated soils, as in SL #3 and #5. The excavated soils would be treated on-site with mechanical aeration.

SL #7
In-Situ Vacuum Extraction

This alternative removes the contamination from the 7500 cubic yards of soil by extracting the organic contaminants as vapors. The process involves no excavation as it is done in-place.

In the Proposed Plan issued prior to the public comment period, EPA presented this alternative as the preferred alternative for addressing soil contamination at the Site.

SL #8
In-Situ Soil Flushing

Soil flushing would inject washing agents (water, steam, or surfactants) into areas of soil contamination, and the injected fluids and contamination would be extracted for treatment and recycling.

SD #1
No Action

Analysis of the No-Action alternative is required by federal regulation and is included for comparison with the other alternatives. Under this alternative, no sediment remediation would be performed. PCBs and PAHs would remain in the wetland sediments above target cleanup levels.

SD #3
Containment of Sediments with an Impermeable Cap

This alternative would cover an estimated 15,800 square feet of contaminated sediments located in on-site wetlands with a multi-layered impermeable cap.

SD #4

Containment of Sediments with a Permeable Cap

This alternative, as with SD #3, would cover approximately 15,800 square feet of contaminated sediments, except that this alternative would utilize a permeable cap.

SD #5

Disposal of Contaminated Sediments at a RCRA Landfill

This alternative would involve the dredging or excavating from the wetlands approximately 1170 cubic yards of sediments (over the same 15,800 square foot area remediated in SD #3 and #4) contaminated above the sediment target cleanup levels. The sediments would be dewatered as needed and transported to an off-site landfill licensed under RCRA unless sufficient land is available on-site to accommodate the sediments in a landfill that can meet RCRA requirements.

In the Proposed Plan issued prior to the public comment period, EPA recommended off-site landfilling as the recommended disposal element of the preferred alternative for addressing the sediment contamination at the Site. This was based upon screening criteria which eliminated the on-site landfill due to inadequate space on-site. The final decision will be made as to the adequacy of the on-site landfill during detailed design investigations.

SD #7

On-Site Incineration

On-site incineration would involve dredging or excavating from the wetlands (over the same 15,800 square foot area remediated in SD #3, #4, and #5) an estimated 1170 cubic yards of sediments contaminated above the sediment target cleanup levels. The sediments would be incinerated to remove hazardous PCB and PAH contaminants.

SD #8

On-Site Sediment Washing

This alternative would involve dredging or excavating from the wetlands (over the same 15,800 square foot area remediated in SD #3, #4, #5 and #7) an estimated 1170 cubic yards of sediments contaminated above the sediment target cleanup levels. The only difference is that this alternative would treat the sediments with a washing solution.

GW #1
No Action

Analysis of the No Action alternative is required by the NCP and is included in the FS for comparison with other remedial alternatives. The aquifer would remain unsuitable for use as a drinking water supply for the foreseeable future.

GW #3
Groundwater Extraction with On-Site Air Stripping

This alternative would involve the extraction and treatment of groundwater by air stripper technology from both near the NHBB building and the dilute plume, and subsequent discharge of the treated water.

GW #4
Groundwater Extraction with GAC

This alternative involves extraction of contaminated groundwater as described in GW #3. The configuration of the entire system is very similar to that of GW #3, with the only significant difference being the method of treatment, carbon adsorption.

GW #6
Well-Head Treatment (South Well) with Air Stripping

This alternative would directly treat groundwater for the Peterborough public water supply through well-head treatment of water extracted by the South Municipal Well using air strippers.

GW #7
Development of an Alternate Water Supply

Under this alternative, an alternate water supply would be provided to the South Municipal Well site community.

GW #8
Groundwater Extraction with a Radial Collector Well with Air Stripping

This alternative is similar to GW #3, the only difference being the method of groundwater extraction near the northeast corner of the NHBB building. At that location, a single concrete caisson would be installed. From the caisson, screened wells would be extended radially at a chosen depth in an attempt to enhance contaminant removal.

GW #9
Groundwater Extraction (accelerated) with On-Site Air Stripping

This is similar to GW #3 except that a greater extraction rate is used for the dilute plume groundwater extraction system, thus resulting in a faster cleanup time for that portion of the aquifer. In the Proposed Plan issued prior to the public comment period, EPA recommended this alternative as the preferred alternative for addressing groundwater contamination at the Site.

II. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

The Site consists of that area potentially affected by a contaminated plume of groundwater whose areal extent is approximately 250 acres. From 1952 until 1982, the South Municipal Water Supply Well drew water from the aquifer affected by the plume. The pumping of the well caused the contamination to be drawn into the municipal supply causing use of the well to be discontinued.

The primary concern of the community has been the adequacy of the municipal water supplies, especially during periods of high demand. Twice during the performance of the RI, the well was used for short periods of time, coinciding with dry summer seasons and high demand. For the second incident, residents concerned with the quality of the South Well water presented a petition to Selectmen which resulted in discontinuance of use of the well.

Planned and implemented modifications to the water supply distribution system have lessened concern over the short term need for the South Well. However, there is still a recognition that the South Well aquifer will play an important role in serving the future water supply needs of the town.

With EPA's issuance of the Proposed Plan in July of 1989, some public concern was expressed over the financial impact that the cost of the remedy might have on NHBB, a large employer in the town.

III. SUMMARY OF COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA RESPONSES

This responsiveness summary addresses the comments received by EPA concerning the FS and Proposed Plan for the Site. Six written sets of comments were received during the public comment period (July 21 - August 19, 1989): two from residents, two from town officials, one from the PRP, and one from the Speaker of the New Hampshire House of Representatives. Several oral comments were presented at the August 3, 1989 informal public hearing. These oral comments clarified and/or reiterated the written comments. A copy of the transcript of the hearing is included as Exhibit B. Copies of the transcript and all comments are also available at the Peterborough Public Library and at the EPA

Records Center at 90 Canal Street, Boston, Massachusetts, as part of the Administrative Record.

The comments from the public and EPA responses are presented below, followed by comments from the PRP and EPA responses.

Part I - Citizen Comments

1. Three commenters stated support of EPA's proposed plan and urged that the cleanup of the aquifer be done as quickly as possible to enable the Town to once again use the South Well.

EPA Response: The principal remedial action objective for addressing groundwater contamination stated in this Record of Decision is to restore the aquifer to drinking water quality in as short a time as practicable. EPA believes that the groundwater remediation alternative proposed as part of the remedy will meet that objective. In addition, by providing separate extraction systems, EPA believes that the dilute plume can be isolated from both the NHBB area plume and the South Well. This will result in a shorter cleanup time for that portion of the aquifer affected by the South Well. Also, should a situation arise that necessitates use of the South Well during remediation, the hydraulic control provided by the dilute plume extraction system will provide a degree of protection. The exact requirements which would be imposed on use of the well, up to and including prohibition of use, will be detailed during remedial design.

2. One commenter suggested an approach to enable emergency use of the South Well during remediation, diverting South Well water through the groundwater remediation facility for treatment before the groundwater entered the water distribution system.

EPA Response: The hydraulic control provided by the dilute plume extraction system coupled with institutional controls restricting the use of the South Well would result in no contaminants being drawn into the zone of influence of the well. EPA believes that approach would provide effective protection without incurring the additional costs associated with the citizen's suggestion. However, as mentioned in the first response, the final decision on whether to restrict or simply prohibit use will be done in conjunction with the remedial design.

3. Three commenters urged that flexibility be allowed in the Record of Decision to enable the use of new technologies as they become available.

EPA Response: EPA agrees that new technologies that provide for a faster, more effective, or less costly cleanup are desireable. Therefore, a wide range of technologies was screened during the FS. The Record of Decision (ROD) has determined that an innovative technology for soil remediation, in-situ vacuum extraction, is appropriate to be applied at this Site. However, as discussed in the ROD, since it is an innovative technology, careful monitoring and continual evaluation of its effectiveness is required. If this evaluation results in the conclusion that a more effective technology should be implemented, it is possible to amend the ROD to enable use of that technology.

4. One commenter requested that flexibility be allowed during the remedial design so that costs can be kept to a minimum. The concern is that consideration be given to the preservation of jobs.

EPA Response: EPA is required by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) to implement a remedy that is cost-effective. The alternatives which make up the comprehensive remedy for this Site have been determined to be cost-effective. During the design phase there are several decisions that still must be made, based upon more detailed design investigations. These decisions could have significant impacts on the final costs of the project. EPA will continue to ensure that design decisions will be made with effectiveness and costs considered.

5. One commenter recommended that monitoring wells be located north of the Noone Falls area and that the cost of any monitoring required if the South Well were to be used during remediation would not be borne by the town.

EPA Response: The decisions on the placement of monitoring wells will be made as part of the final design of the remedy. The decision as to when and how the South Well would be used will be dependent on the final configuration of the dilute plume extraction system. The monitoring associated with that system will be determined in conjunction with the design of the extraction system. It is anticipated that all monitoring costs will be considered as operational costs of the remedy.

Part II - PRP Comments

The PRP, NHBB, presented variations on the preferred alternatives which EPA presented in the Proposed Plan. These variations were documented in a letter and amplified on in a meeting, the minutes of which have been made part of the Administrative Record.

6. The PRP has suggested that EPA select a modification of GW #3 as the management of migration component of the remedy.

> This alternative would expand the existing groundwater treatment facility to accommodate flows up to 400 gpm initially. Data would be collected during a one year trial of the expanded plant to determine the effectiveness of remediating the dilute portion of the plume with the goal of approximating the cleanup schedule presented in the Proposed Plan (about 7.5 years). The data would be evaluated to assist in design of a full-scale treatment. As part of this modification and central to it from the standpoint of NHBB, is that the extracted groundwater be treated in one treatment facility. NHBB asserts that this alternative can more cheaply handle the extracted groundwater from both the NHBB and dilute plume areas while achieving a cleanup timeframe compatible with EPA's goal of 7.5 years.

EPA Response: The major objective of the remedy selected by EPA is to clean the aquifer as soon as practicable. The parameters used in the model which helped determine the probable cleanup time were literature values which were deemed appropriate for the types of coarse sands and gravels found at this Site. Any preliminary design information which could be generated to confirm those values would aid in designing an optimal system. However, if the results of further investigations indicate that the aquifer parameters assumed in the FS resulted in too low a groundwater extraction rate to achieve EPA goals, then EPA would expect that the rate would be increased (and hence the treatment plant expanded) in order to approach the 7.5 year cleanup of the dilute plume.

Furthermore, a rigorous cost-effective analysis of one treatment plant compared to two treatment plants needs to be done using consistent methodologies and parameters. Complicating the analysis is the shorter time it will take to clean the dilute plume. While the extraction of NHBB area groundwater can be expected to continue for at least 19 years, the dilute plume system could be shut down much sooner. Carrying that much excess capacity in a single plant may not prove cost-effective. The ROD provides that if it can be shown that one, rather than two treatment facilities can meet the remedial action objectives and the statutory requirements, and present an equivalent balance of the evaluation criteria, then one facility may be constructed.

In summary, final determinations relating to the number of treatment facilities, number and location of extraction wells, groundwater extraction rate, and the number and location of discharge points will be based on site specific data collected during the remedial design. Remedial action objectives will be met.

7. The PRP supported the selection of the soil remediation technology, vacuum extraction, but have expressed concern thast this innovative technology may be unable to reach the very low soil cleanup levels. The PRP requested that flexibility be allowed during remedial design to evaluate technological advances being made in the treatment of contaminated soils.

EPA Response: EPA's position on the use of vacuum extraction is presented in Section X.B.1. of the ROD. The remedy selected was the best of those identified in the FS prepared by the PRP. It is not clear what other technological advances are referred to nor is it clear how they could be evaluated during remedial design so as not to delay implementation of the remedy. EPA's concerns are stated in the response to Comment #3.

8. The PRP recommended a modified sediment treatment alternative because it believes that the selection of the EPA alternative is premature. The PRP has proposed burying a portion of the PCB-contaminated sediments in an unlined, on-site landfill to be located under the NHBB parking lot with a cap which would meet federal landfill closure requirements. The remaining portion of the PAH-contaminated sediments would be shipped off-site for disposal.

EPA Response: There are several reasons why EPA does not agree with NHBB's remedial alternative. The PRP's proposal would result in the creation of a new landfill at the Site which would require long-term monitoring and maintenance. Not only would federal landfill closure requirements need to be met, but federal requirements for new landfills related to a liner system would also need to be incorporated into the design. In general, while there is a preference for on-site solutions expressed in federal law, in this case EPA has selected off-site disposal and does not believe that there are practicable on-site treatment alternatives for the sediments. Off-site disposal will provide a protective remedy that permanently removes contaminants from the site. In this case, EPA believes that the short and long term effectiveness of an off-site, RCRA-licensed landfill that has been designed to contain hazardous substances is more protective than a new landfill constructed on-site.

EXHIBIT A

COMMUNITY RELATIONS ACTIVITIES

EXHIBIT A

COMMUNITY RELATIONS ACTIVITIES AT THE SOUTH MUNICIPAL WATER SUPPLY WELL SITE PETERBOROUGH, NEW HAMPSHIRE

EPA Community Relations activities conducted at the South Municipal Water Supply Well site have included:

- August 23, 1985 - EPA issued a press release announcing the availability for public review of the work plan for the Remedial Investigation of the site.
- October 2, 1985 - EPA conducted a public meeting in Peterborough to discuss the work plan for the Remedial Investigation of the site.
- July 23, 1986 - EPA issued a press release announcing that New Hampshire Ball Bearings, Inc. would perform the site investigation under the terms of a Consent Order signed with EPA.
- August, 1986 - EPA issued a Community Relations Plan outlining issues of concern to the community and activities to address information and public involvement needs.
- December 1986 - EPA issued a fact sheet on the progress of the Remedial Investigation and plans for future EPA activities at the site.
- May 17, 1989 - EPA issued a press release announcing the availability of the report on the results of the Remedial Investigation, and announcing a public meeting to present the results of the Remedial Investigation.
- May 24, 1989 - EPA held a public meeting, as part of the Peterborough Selectmen's meeting, to discuss the Remedial Investigation results and upcoming steps in the Superfund process, and to offer the public an opportunity to ask questions about the site.
- May 1989 - EPA issued a fact sheet to the site mailing list of interested and affected individuals explaining the results of the Remedial Investigation and EPA plans for future action at the site.

- July 13, 1989 - EPA issued a press release to the site mailing list announcing the availability of the Feasibility Study and Proposed Plan for the site; the schedule for the public informational meeting, public hearing and public comment period on the Feasibility Study and Proposed Plan; and the availability of the Administrative Record for the site.

- July 14, 1989 - EPA placed a paid public notice in the Keene Sentinel newspaper announcing the availability of the Feasibility Study and Proposed Plan for the site; the schedule for the public informational meeting, public hearing and public comment period on the Feasibility Study and Proposed Plan; and the availability of the Administrative Record for the site.

- July 20, 1989 - EPA held an informational meeting, during the Peterborough Selectmen's meeting, to review the findings of the feasibility study, present the Proposed Plan, explain the public comment process, and answer questions from the public and local officials.

- July 21 - August 19, 1989 - EPA held a public comment period on the Feasibility Study and Proposed Plan.

- August 3, 1989 - EPA held an informal public hearing to accept comments on the Feasibility Study and Proposed Plan.

EXHIBIT B

PUBLIC HEARING TRANSCRIPT

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION I

COPY

PUBLIC HEARING
PETERBOROUGH TOWN HALL
PETERBOROUGH, NEW HAMPSHIRE

Thursday Evening
August 3, 1989
7:30 p.m.

SOUTH MUNICIPAL WATER SUPPLY WELL SITE PROPOSED SUPERFUND PROGRAM PLAN

PUBLIC COMMENT re PREFERRED REMEDIAL ALTERNATIVES PROPOSED BY EPA

Appearing for the EPA: Dan Coughlin, Hearing Officer
Chief, New Hampshire Superfund

and Roger Duwart
Remedial Project Manager

U.S. Environmental Protection Agency
Region I
John F. Kennedy Federal Building
Boston, MA 02203

Court Reporter: Richard E. Cowing, CSR

I N D E X

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PROCEEDINGS

[The EPA public hearing commenced at approximately 7:30 p.m.]

SELECTMEN CHAIRMAN: Turning to the public comment period this evening on the EPA and the New Hampshire Ball Bearing cleanup of their property and the South Well.

This is not being conducted by the Peterborough Selectmen; it is being conducted by the EPA. And comments made this evening -- and I'm sure they'll be explained -- comments being made this evening will be recorded by the public stenographer that they have with them.

At the moment the Selectmen will not make a comment. They will have a comment to make.

So the hearing officer for the EPA is Dan Coughlin, and I would turn the meeting over to him at this time.

MR. COUGHLIN: Good evening. My name is Dan Coughlin. I'm chief of the New Hampshire Superfund Section at EPA in Boston.

We're here tonight to conduct a public hearing on the cleanup of the South Municipal Well Superfund site at New Hampshire Ball Bearing in Peterborough.

With me is Roger Duwart on my right, to your left; he's the project manager for EPA.

The purpose of the hearing is to obtain formal comments for the record on the proposed plan that was issued approximately a month ago and the Remedial Investigation and Feasibility Study that has been out for -- the Remedial Investigation has been out approximately six months; the Feasibility Study was issued probably also a month ago.

Before we actually start the hearing process, let me tell you how we will run the process. First, Roger will give a brief description of the proposed plan which will outline EPA's preferred remedy for the cleanup of New Hampshire Ball Bearing or the South Municipal Superfund site. At that point we will accept any formal oral comments that you wish to make. There are cards out back. If you wish to make a comment, you should have signed a card on your way in; if you haven't, please do so. We will call on people in order of when you signed up on the cards.

After each person has made a comment we will reserve the right to ask any questions to clarify those comments; if not, we will go on to the next person.

At the conclusion of the hearing we will terminate the hearing, officially, and will open up a brief question-and-answer session where you can ask questions of either myself or Roger, and we'd be happy to respond. We also have with us tonight members of the New Hampshire DES sitting up back, and if there are any questions that you hav for them I'm sure they'll be glad to respond.

There is a microphone up front. I think you can make your comments from your seats, if you'll just stand up. I think the acoustics are good enough in here. If not, then we may ask you to move up front. But we'll try it at your seats for the moment, and that should work just fine.

As you know, we had a public meeting two weeks ago to explain to you the proposed plan and the content of the RI/FS which essentially led up to the proposed plan and our recommendation as to how we would expect to see the Superfund site cleaned up. The public comment period will end on August 19th. So if you don't make comment tonight and you wish to make a written comment -- and we would encourage you to do so -- please make sure your written comments are addressed to us, the address is in the proposed plan. If you don't have one, there are some up back; just make sure you get one, and make sure they're postmarked on or before August 19th.

Okay. Any questions on how we're going to conduct the hearing?

Okay, Mr. Dyer.

MR. DYER: I just had one comment, one question. You said August 19th. I was under the impression it was August 20th, was the end of the comment period.

MR. DUWART: It began July 20th and ends August 19th. The 20th is a Sunday, actually. August 20th is a Sunday. So it will end Saturday.

MR. DYER: Midnight on the 19th?

MR. DUWART: Yeah.

MR. DYER: Thank you.

MR. COUGHLIN: Mr. Thompson?

MR. THOMPSON: That was my same question. It's midnight on the 19th, or is it midnight on the 18th?

MR. DUWART: Postmarked the 19th.

MR. THOMPSON: As long as it's postmarked the 19th.

MR. DUWART: Yeah.

MR. COUGHLIN: Postmarked the 19th.

Anything else?

[No response.]

MR. COUGHLIN: Okay. With that, Roger, why don't you go ahead.

EPA PRESENTATION

[Overhead projection display being utilized.]

MR. DUWART: This will be a very brief overview. Most of the faces in here are familiar, you heard this last week -- two weeks ago.

The proposed plan that EPA has presented to the public two weeks ago consists of three preferred alternatives, handling three different media at the site. First and most important, and the one that everybody is probably most familiar with, is the ground water. What we have proposed is a groundwater extraction and treatment system; actually, two extraction systems -- one to handle the concentrated plume which is close to the NHBB facility; a second extraction system to get what is known as the dilute plume which has migrated off the facility, and which in times of pumping at the South Well is moved into that zone of influence.

The two systems will be hooked up to a treatment facility or two treatment facilities, depending on the design as we move through the remedial design. The treatment technology chosen has been air stripping. After the air stripping, to drive the volatiles off, which is the contaminants that we're concerned about here, the air stream will actually be placed through activitated carbon to remove those contaminants before they are discharged to the atmosphere.

The effluent, the water portion of the treatment system, will be discharged into the ground, probably behind New Hampshire Ball Bearing, to enhance the removals. There will be some possibility that we will continue with the discharge to the Contoocook River as well. Again, this is going to be a design decision that will take place after the Record of Decision is issued.

There's two other -- actually, three other aspects of the groundwater portion that I want to make clear. One is that we will be looking during design at the possibility of a cyclic pumping or steam injection. Right now it looks like it will probably be a cyclic pumping system which will help remove the contaminants especially near the Ball Bearing plant which the heaviest concentrations are located. That cyclic pumping -- pump it, let is rest; pump it again -- will help to remove those heavily-contaminated areas, the heaviest contamination, from the aquifer. It will be more effective than straight pumping.

As I said, we will be looking at steam injection. At this point the preliminary investigations indicate that it probably would not be cost-effective to use steam.

During the remedial action and on into the future we will have a groundwater monitoring system in place, probably quarterly initially. That again will be determined during the design phase. This will be to ensure the effectiveness of the remedy that we have in place and to ensure that we are not allowing any contamination to migrate any further from the aquifer that we're looking at right now.

Finally, another important part of this groundwater No. 9 -- which is fully described, by the way, in the proposed plan and the Feasibility Study -- is the institution of controls on the use of the South Well. At this point we are looking at probable restrictions and possible prohibition of the use. Again, that will depend on the final design of the extraction system that we do put in out there. This is something that we want to ensure that that well does not affect our remedy and that the contaminants that right now are not being drawn into that well will not be drawn into the well. So that's another very important aspect of the Record of Decision as we move along in this process.

Another part of the proposed plan, another preferred alternative for soils, and it goes hand in hand with the cleanup of the groundwater, is in-situ vacuum extraction of the soils in and under the northeast portion of the New Hampshire Ball Bearing facility and just out front of the facility. In-situ vacuum extraction is similar to an extraction system for groundwater only it occurs above the water table. What we'll be pulling through the granular overburden there is clean air which will drive the volatiles again off; they will again be run through carbon columns and the effluent or the air stream will be discharged to the atmosphere.

We estimate this will take approximately two years. It's important to do concurrently with the groundwater treatment because it will save us from a lot more operation and maintenance costs associated with treatment of the groundwater, if we prevent the migration of those contaminants into the water table, the continued migration of those contaminants into the water table.

The third and final portion of the proposed plan is the preferred alternative for the sediment contamination in front of the Ball Bearings plant. We have chosen the disposal of the contamina~~p~~ted sediments at an off-site land fill. We would expect, to the maximum extent possible, to excavate those sediments so we will try to do that in the dry period so that we wouldn't have to dredge and create a lot of sedimentation in the wetlands.

As part of this portion of the proposed plan we would be revegetating those wetlands and restoring them to as close to possible as beforehand in terms of the groundwater contours -- or the surface contours.

The three pieces together make up our proposed plan. As I said, it is fully explained, and the alternatives to them are fully explained in the Feasibility Study. In addition, New Hampshire Ball Bearings has proposed some modifications as well. The proposed plan is another source of information for you to take a look at those, and we are welcoming here tonight comments on those -- on the proposed plan and these alternatives.

MR. COUGHLIN: Okay, that is the end of our presentation this evening. And so we can go into the comment period.

PUBLIC COMMENT

MR. COUGHLIN: As was previously stated, everything is being transcribed. We will have a copy of it made and we will respond to any comments in the response summary which is a part of the Record of Decision which will be issued when we make that decision. So each and every one of your comments will be given careful consideration and will be responded to in that summary.

[Brief pause.]

MR. COUGHLIN: Ted Hoffman, would you like to make a comment?

MR. HOFFMAN: I have just a few comments. The first comment is really a correction. I assume that the EPA received my letter of July 22nd dealing with the comments? Is it safe to assume that the EPA received my letter of July -- all right. I would like to make a correction. Since I'm my own typist, I have to assume full responsibility. But on page two, under paragraph 3(e), I, in error, included the word "soil" in there. And this paragraph deals with my concerns about the proposed alternative sediment operation, and since there's no alternative to the soil correction process, then obviously I made an error in saying that. So, therefore, paragraph 3(e) should have the word "soil" deleted since it makes no sense to be in there.

The other comments also deal with this same letter that I sent, and in that letter I expressed my concern, which I think reflects a lot of the townspeople's concern, that the South Well aquifer be cleaned in the shortest practical time. "Practical" is an important word, "shortest" is an important word. And in the letter -- and I'm going to add a little more technical reference to support that -- I pointed out that the Town of Peterborough now depends exclusively upon the North aquifer, drawing from the North Well and the Summer Street Well, which are about 3,000 feet apart, and there's a proposed new site, the Tarbell (ph) site, that's about a thousand feet away, but all of them are in the same general aquifer. And, therefore, it's of vital importance to the Town to have the South aquifer cleaned as soon as possible in the event that there should be an emergency need for water due to some unforeseen contamination of the North aquifer.

And to support the fact that the North aquifer is vulnerable, I'd like to quote from the Whitman & Howard aquifer map and protection study made for the Town of Peterborough in November of 1985. And on page 15 they made the statement: "The South aquifer is a proven aquifer with major groundwater potential. If the planned groundwater cleanup in this aquifer is successful, and if aquifer protection measures are taken, the South aquifer could once again be a major groundwater source." So that the South aquifer remains a very important part of the Town of

Peterborough's water supply.

Also in that same report, on page 48, they state: "The Contoocook River provides substantial amounts, if not the majority, of recharge to areas that are heavily pumped. Water from the river is induced into the aquifer near the well. If a hazardous liquid spill occurs in the river, contaminated water could travel quickly into primary aquifer areas and enter the well."

The point of my quoting that is to reinforce my contention that Peterborough's primary aquifer, the North aquifer, is vulnerable, and the more that can be done to reduce the critical nature of that sole aquifer's vulnerability by bringing the South aquifer into play, the better it is.

One further point in support of that same aspect -- In a letter of May 18, 1989 from Whitman & Howard to Mr. John Isham, the town administrator, concerning the South Well Reactivation Program, in the lower part of the first page they state: "It is almost certain that if the well was returned a hundred percent full service that sooner or later contaminated water from the plume would be drawn to the well. This happened in the past and would almost certainly happen again. It is therefore logical to assume that somewhere between zero percent and one hundred percent pumping there lies a threshold pumping rate below which contaminants will be drawn into the well."

And this is the point I'm really building to -- "It is important to state that even if this threshold turns out to be very low, it will still be cost-effective for the Town to exploit. The well is in place and operational after all. There are no costs other than power and maintenance to run it. It is by a significant margin your cheapest 'new' supply on a per-gallon basis."

My only reason for quoting that is that I understand there's some interest on the part of New Hampshire Ball Bearing in acquiring the South Well, but I understand that's strictly in the discussion stage, and I just want to state that in my opinion -- and I think the townspeople would bear it out -- that any proven water supply that we now own should never be sold; you can't put a price on a good water supply. Peterborough has been here 250 years, it may take 30, 40 years or what-not to clean the South Well; but you have to consider Peterborough is going to be here at least another 250 years and so, therefore, even though we can't use the well now we should not part with it.

Thank you very much.

MR. COUGHLIN: Okay, thank you.

Richard Pease, from the New Hampshire DES.

MR. PEASE: I would first like to note that the State of New Hampshire has been an active participant in the investigation of the South Municipal Well site since the time of the discovery of the site through a sampling by the New Hampshire Water Supply & Pollution Control Commission.

[Speaker requested to move closer to recording microphone.]

MR. PEASE: The State of New Hampshire has conducted a hydrogeological study of the site area prior to the inclusion on the national priorties list, and during the Superfund remedial process the State participated in the monthly progress meetings that were conducted by New Hampshire Ball Bearing and the EPA and their consultants.

Also the Department of Environmental Services reviewed all the technical submittals that were made to the Environmental Protection Agency, and has participated in the management and review meetings. And therefore, all this involvement by the Department of Environmental Services, we have no objections to the proposed plan.

MR. COUGHLIN: Thank you.

Mr. Michael Samide.

MR. SAMIDE: "Samide" [Pronunciation distinction].

MR. COUGHLIN: "Samide." Excuse me.

MR. SAMIDE: My name is Michael Samide, I'm the president of New Hampshire Ball Bearings. I apologize for not being able to make your meeting two weeks ago, I was out of town.

New Hampshire Ball Bearings considers the Town of Peterborough and its employees, its business here very important -- "the" most important thing we have. We're in agreement with the Federal EPA, and we've worked very closely with them, and the State EPA. We have aggressively pursued the remedy of the situation up there, and will continue to do so.

For over a year and a half now we have been processing the contaminated groundwater, and we will continue at a very aggressive pace to clean this up in the most expeditious manner we can. To date we've spent three million dollars, and we are committed to do what's right for Peterborough and this company.

We have other plans, with regard to some of the comments that Mr. Hoffman made, to alleviate some of the town's problems and concerns of the water usage. We're actively implementing a situation where we think we can save the town a million gallons of water a day by recycling the existing well water now, thus reducing our share of the town's usage by some 20 percent.

We agree with the EPA, Mr. Duwart's comments, that a one-to-two system air stripping thing, and we would hope that we could finalize that in the design phase. The important thing is, from our perspective, timeliness and cost-effectiveness, and to us the longer we wait and the more time that drags on, the more it costs us. So time is of the essence.

And the last comment I would like to make is specifically to Mr. Hoffman -- New Hampshire Ball Bearings has no intention of purchasing the South Well at this point in time; we're not even entertaining that. So you can rest assured we will not be doing that. Those are my comments.

MR. COUGHLIN: Thank you.

Mr. Thompson. Jim Thompson.

MR. THOMPSON: Okay. I'm Jim Thompson with New Hampshire Ball Bearing, and I'd like to add a few comments on the alternative proposals that New Hampshire Ball Bearing presented at the previous meeting, and the one-to-two system discussion earlier.

New Hampshire Ball Bearing feels that one system can be very effective, and we mean one system, we mear the stripping towers and using extraction wells to pump from both the plume area near the plant but also what we call the dilute plume across the road and in the area of EM-109 and EM-103 as you see on that map right there -- I guess we could call it a map -- (referring to overhead projection display) --

MR. COUGHLIN: This being the dilute plume area (indicating on overhead projection map).

MR. THOMPSON: -- out in that area. And in the earlier discussions there may have been some confusion as to what we were really looking at, and at this point we believe expansion of the existing stripping tower system that is at the northeast corner of our plant -- would you please point to that.

[Mr. Coughlin complying.]

MR. THOMPSON: Thank you. Bringing that to a larger pumping capacity and using extraction wells as far east in that plume as both the EPA and the Company work out in detail in the design phase, can be an effective timely remediation. It can also be much more cost-effective for the Company. And we estimate in the area of one million to two million dollars that we can save using that; that is a significant savings to the Company. And we hope that the EPA will write the Record of Decision such that this can be strongly considered in the design phase. Even to the point where the Company is willing to quickly expand that system -- and when we say "quickly" we mean in the next few months and not next year -- such that it will provide additional data from both the dilute plume and the plume near our plant that we can use in our modeling and in the calculations to get a better handle on just how long it will take to clean it up.

A point we wish to make very clearly when we discuss one system versus two system: we can always go to the second system. Good information, better information can be gathered by expanding that single system and quickly using "live" information as opposed to the theoretical calculations which got us to the estimate of some seven to 20 years or whatever -- the seven to 30 years that we're looking at at this time.

The Company is willing, and we'll be discussing that with EPA and seeking support for that expansion in the coming months as we go parallel into the process of Record of Decision, through Consent Decree, and down through design phase and effectively into remediation in the coming months next spring.

As far as the soil, I think we've made it very clear as we are fairly -- in fact, we're comfortable with the proposals for the soil cleanup. As far as the sediments, the Company does have alternatives that we would like to pursue and to take some more time to do that. The contamination in that sediment area attaches itself to the -- the sediment to the soil, it is not migratory at this point. A few months to gather some more information, to talk some more issues that we would like to discuss with the EPA, may help us find a more cost-effective solution. So we are proposing and, to reiterate, requesting the EPA to write the Record of Decision with some flexibility that this may be considered. Thank you.

MR. COUGHLIN: Thank you.

Okay, Mr. Dyer, Peterborough Board of Selectmen.

MR. DYER: On behalf of the Peterborough Board of Selectmen, my name is Martin Dyer and I'm chairman of the Board of Selectmen this year.

We would like to say and be on record as supporting the work that Ball Bearing is doing and has done; they have been very responsible in this situation, they stepped forward very early and have done more than were asked to do in trying to clean up the well.

We would like to see it cleaned up in the shortest possible time, and if that means changing the method or removing the solvents from the ground or something, we would approve that. We would hope that the Record of Decision would be written in such a fashion that allows a degree of flexibility both to Ball Bearing and to EPA. There may be some methods that come along in the next year or two that could be very useful, and we would hate to see the decision written so that it was very rigid and new policies could not be followed. We would like to see this cleaned up in the best possible way.

We agree with the New Hampshire Ball Bearing people, we have met with them. We have also reviewed the report of the EPA, and we agree with them that the method outlined for the soil seems to be the proper method. On the sediment we would like to see additional study done as to capping or removal, and whichever is the best method.

As far as the stripping tower goes, we would like to see any method that keeps the cost down to our employer here in town, and a company that is in business to make a profit, we'd hate to see them lose all their profit to some method that wasn't appropriate. We would hope that the Record of Decision would be flexible so that if one tower, two towers or three is the best, that could be put into use.

We hope to clean the area, clean the well up, and possibly use it in the future. I think it would be some years before we do get a chance to use it. We are in reasonably good shape now. As Ted has pointed out, we are getting most of our water from the North aquifer which could present a problem under certain circumstances.

The present Board of Selectmen, and I think others that might follow us, have no intention of selling, leasing, loaning or disposing of any water source that we presently have or may acquire in the future. We still have water rights to Cunningham Pond which haven't been used in probably 20 years.

So we will maintain or keep possession of the South Well, and hopefully it will be cleaned up in the shortest possible time at the lowest cost to all parties involved so that we can proceed and move forward.

Thank you.

MR. COUGHLIN: Thank you.

Anybody else who would like to make a comment?

MR. THOMPSON: A comment I would like to make that I forgot to make is New Hampshire Ball Bearing is very interested in the public's comments. On the table in the back I put a note, a piece of paper with my name, our address, and my telephone number -- I'm Jim Thompson. And if any of the public would like to know more about New Hampshire Ball Bearing's position or any information that we can provide the public, we invite them to call me and we will arrange for that information to be provided. And -- that's it, thank you.

MR. COUGHLIN: Thank you.

If there are no more comments, let me officially declare the hearing closed.

QUESTION-AND-ANSWER SESSION

MR. COUGHLIN: We can now go into a question-and-answer session. If anybody has any questions that are in need of answer, we'd be happy to try to address them for you.

Yes, sir.

MR. DUNBAR: Are you taking general comments, too, or --

MR. COUGHLIN: This is just a general

question-and-answer session now. This will be transcribed as well. You can make --

[Inaudible comment.]

MR. COUGHLIN: Okay.

MR. DUNBAR: I was glad to hear Mr. Dyer's comments and concerns for New Hampshire Ball Bearing's financial well-being, but speaking as a member of the town and someone who uses the water, my first concern is the health and welfare of the citizens of Peterborough and secondary would be the concern for the financial welfare of an employer, and I would hope that would be the concern of the Town, too.

My second concern is that other ratepayers in the town are not -- and I'm not sure if they are or not -- supporting the cleanup of the South Well through any increases in rate charges or work that had to be done ahead of schedule because of the loss of one well.

MR. COUGHLIN: Okay, thank you.

[Court reporter requesting name of speaker.]

MR. COUGHLIN: Oh yes, would you state your name please.

MR. LEEDHAM: I would just answer one part of that, Andy, in saying that we had thought -- I'm not sure where this fits in with the EPA's schedule, but --

MR. DUNBAR: (Interposing) Charles, he needs a name. Andrew Dunbar -- D-U-N-B-A-R.

MR. LEEDHAM: Is it okay now? Okay. Andrew Dunbar.

We assumed that it went without saying that we are primarily concerned about the quality of the water and the continuation of adequate water supply for the Town of Peterborough, and our concern for the financial arrangements of New Hampshire Ball Bearings is definitely secondary, but it's something that we do take into account because they are a citizen of the town and a major employer.

MR. COUGHLIN: Any other questions? Yes, sir.

MR. SAMIDE: I'd just like to reiterate my point for Mr. Dunbar, that New Hampshire Ball Bearings is concerned about the water supply also and has taken methods -- steps right now to be sure that Peterborough has the water supply; that everything that we can possibly do we're implementing right now, in terms of cutting our usage, basically, to almost zero.

MR. COUGHLIN: Mr. Dyer.

MR. DYER: Well, I'll reiterate again what was said by the president of Ball Bearing. They have gone tc considerable expense to themselves -- it's going to save them money -- to redo their plumbing and their cooling machines and other devices, to reduce, if possible, gallonage of disposable water that they're using by up to a million gallons a day. This will make a substantial saving to the amount of water that we're pumping from the North Well at this time.

Part of our problem a year ago was inefficient and too small pipes connecting the Summer Street Well with Main Street and some of the pipes on Sanville (ph) Road. That is being corrected now. That is being corrected with water department funds. It does not come out of the taxpayers' money, it comes out of the water department funds, paid by water department users. This was necessary anyway, whether the South Well was operating or not. But I think Ball Bearing is taking a good lead here in reducing the water usage, and I think we could all take a line from that and try and conserve water. I think water is going to turn out to be one of our most precious commodities that we have.

MR. DUNBAR: Could someone from New Hampshire Ball Bearing perhaps let us in on what steps are being taken to ensure that this doesn't happen again?

MR. THOMPSON: Ah yes. The Company at this time -- all volatiles, all the chemicals that are used in th plant are handled in the strict accordance with current regulations, all drains -- there is no discharge to the environment that we know of. We've gone to great pain in the past 10, 15 years to upgrade. It actually started in the seventies. Our knowledge got better in the mid- to late-seventies in controlling this. The conditions which have occurred over the years occurred in the fifties, sixties, and early seventies, as far as we can tell, although it's sketchy to go back and gather all the data. But certainly, in this modern age, in the eighties, all discharges and controls were implemented to prevent discharges to our environment. So we're very, very concerned about that.

I'd like to -- may I comment on, to support or provide some more information to the public on what the Company has done. Think of that stripping tower system at the northeast corner of the building. We made the decision -- with support from the EPA, but it was a Company decision -- to put that system in place; we made that in about '86 -- designed it in '87, late '87.

While the formal process was going on, we put about a million dollars in the northeast corner's system. To date, as of the end of July, in the past year to 15, 16 months, some 30 million gallons have been pulled out of the ground and sent through the stripping system and cleaned up.

So we've aggressively taken that stance with a parallel effort to the formal process that EPA has to go through by law. So I think it's a credit to New Hampshire Ball Bearing to -- on a plus side, also, that that was made by our senior management back some two years ago.

And a point I think it makes very handily -- yes, New Hampshire Ball Bearing is extremely concerned that the Town has water. We want to clean it up. We believe we have some alternatives that makes some good sense, too. Thank you.

MR. COUGHLIN: Anybody else?

[No response.]

MR. COUGHLIN: If not, I guess we'll bring it to a close. Thank you very much for coming. We appreciate your comments. Thank you.

SELECTMEN CHAIRMAN: Thank you, Dan. I'll call a five-minute recess now.

[The EPA public hearing was concluded at 8:05 p.m., August 3, 1989.]

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COURT REPORTER'S CERTIFICATION

I, Richard E. Cowing, a certified court reporter in the State of New Hampshire, do hereby certify that the foregoing is a true and accurate transcription of the public proceedings conducted at Peterborough, New Hampshire, on Thursday, August 3, 1989 relative to the EPA Proposed Cleanup Plan for the South Municipal Well, to the best of my knowledge and belief, professional skills and abilities, and under the conditions of the recording environment.

Richard E. Cowing

Richard E. Cowing, CSR

August 10, 1989

APPENDIX D

ADMINISTRATIVE RECORD INDEX

Not included.